

Special Initiatives
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Review of Financing of Immunization Programs in Developing and Transitional Countries

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Partnerships
for Health
Reform

PHR

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The Partnerships for Health Reform (PHR) Project seeks to improve people's health in low- and middle-income countries by supporting health sector reforms that ensure equitable access to efficient, sustainable, quality health care services. In partnership with local stakeholders, PHR promotes an integrated approach to health reform and builds capacity in the following key areas:

- ▲ *better informed and more participatory policy processes in health sector reform;*
- ▲ *more equitable and sustainable health financing systems;*
- ▲ *improved incentives within health systems to encourage agents to use and deliver efficient and quality health service; and*
- ▲ *enhanced organization and management of health care systems and institutions to support specific health sector reforms.*

PHR advances knowledge and methodologies to develop, implement, and monitor health reforms and their impact, and promotes the exchange of information on critical health reform issues.

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Abstract

This paper presents a review of selected issues related to immunization financing in developing and transitional countries. Information for this review was obtained through an extensive literature search and through an E-mail survey sent to all United Nations Children's Fund (UNICEF) and Pan American Health Organization (PAHO) country offices. Information is presented in four main areas: (1) the costs of immunization programs, with a focus on the costs of introducing additional vaccines; (2) financing of immunization services, including trends in government vs. donor funding, financing of new vaccines, and the use of cost recovery for immunization services; (3) the effects of a changing health sector on immunization financing, including the impact of decentralization, the role of the private sector in providing immunization, and the impact of disease eradication programs; and (4) country experiences with international mechanisms to facilitate vaccine financing, such as the Vaccine Independence Initiative, the PAHO Revolving Fund, and the European Union Initiative. In addition to summarizing existing information and lessons learned on the financing and costs of country-level immunization programs, this paper identifies critical gaps in information in immunization financing. Further information will be obtained through a series of country case studies on immunization financing that the Partnerships for Health Reform Project is conducting in collaboration with the World Health Organization and PAHO.

Table of Contents

Acronyms	ix
Acknowledgments	xi
Executive Summary	xiii
1. Background and Methodology	1
1.1 PHR's Special Initiative on Immunization Financing	1
1.2 Purpose and Structure of this Review Paper	3
1.3 Methodology, Data Sources, and Limitations of this Review	4
2. Findings	7
2.1 Costs of National Immunization Programs	7
2.1.1 Introduction	7
2.1.2 Methodological Issues in Costing of Immunizations	7
2.1.3 The Costs of Immunization Programs	8
2.1.4 The Additional Costs of Introducing Vaccines into Immunization Programs	11
2.1.4.1 Additional Costs of the Vaccines	11
2.1.4.2 Total Additional Costs of Adding New Vaccines	13
2.1.5 Gaps in Information on the Cost of Immunization Programs	15
2.2 Financing of Immunization Programs	15
2.2.1 National Government and Donor Financing of Vaccines and National Immunization Programs	16
2.2.1.1 Financing of Vaccines	16
2.2.1.2 Financing of Additional Vaccines	21
2.2.1.3 Financing of Routine Immunization Programs (Total Costs)	25
2.2.1.4 Summary of Findings and Implications for Sustainability of National Immunization Programs	31
2.2.2 Cost Recovery for Immunization Services	31
2.2.2.1 Prevalence of Cost Recovery for Immunization Services and Types of Mechanisms Used	31
2.2.2.2 Rates of Cost Recovery and Use of Recovered Funds	37
2.2.2.3 Impact of Cost Recovery on Utilization of Immunization Services	37
2.2.2.4 Summary of Findings	38
2.2.3 Gaps in Information on Immunization Financing	38
2.3 Effects of a Changing Health Sector on immunization Financing	39
2.3.1 Impact of Health Sector Decentralization on Immunization Financing	39
2.3.2 Role of the Private For-Profit Sector and NGOs in Immunization Service Delivery and Financing	42
2.3.2.1 Role of the For-Profit Private Sector	44
2.3.2.2 The Role of NGOs in Immunization Programs	46

2.3.3	The Impact of Polio Eradication Programs on Immunization Financing	46
2.3.4	Gaps in Information	47
2.4	Country Experiences with Mechanisms to Facilitate Vaccine Financing	48
2.4.1	The PAHO Revolving Fund	49
2.4.1.1	Description of the Fund	49
2.4.1.2	Current Status and Progress of the Fund	50
2.4.1.3	Assessment of the Revolving Fund	51
2.4.2	The Vaccine Independence Initiative	51
2.4.2.1	Program Description	51
2.4.2.2	Current Status and Progress of the VII	52
2.4.2.3	Assessment of the VII	53
2.4.3	The European Union Initiative	55
2.4.3.1	Program Description	55
2.4.3.2	Current Status and Progress of the Initiative	56
2.4.3.3	Assessment of the EU Initiative	56
2.4.4	Gaps in Information	57
3.	Summary of Major Findings and Gaps in Information	59
3.1	Major Findings	59
3.2	Gaps in Information	62
	Annex A: Supplementary Tables from Email Surveys	65
	Annex B: UNICEF and PAHO E-Mail Survey Forms	73
	Bibliography	83

List of Tables

Table 1.	Response Rate of Countries to UNICEF and PAHO E-mail Surveys by Region	5
Table 2.	Countries Responding to the UNICEF or PAHO Email Surveys	6
Table 3.	Findings from Studies on Costs per Fully Immunized Child	9
Table 4.	Cost per Fully Immunized Child by Service Delivery Strategy	9
Table 5.	Findings from Studies on Cost-Effectiveness and Cost-Benefit of Vaccines	9
Table 6:	Findings from Cost-Effectiveness Studies of Immunization Programs with Managerial Implications	10
Table 7.	Example of a Cost/Outcome Matrix for Immunization Services	11
Table 8:	Additional EPI Vaccines: Cost, Schedule and Number of Doses Required*	12
Table 9:	Possible Elements Requiring Additional Costs for the Introduction of New Vaccines into National Immunization Programs	14

Table 10: Increase in Cost per FIC Associated with Introduction of Additional Vaccines (and Micronutrients)	15
Table 11: Percent of Routine Vaccines Financed by Government, Selected Countries, 1995-1997*	18
Table 12: Distribution of Countries Responding to the E-Mail Surveys by the Percentage of Vaccine Supply Financed by the Government (for latest year available)	19
Table 13: Number and Proportion of Countries Responding to the E-mail Surveys that have a Specific Budgetary Line Item for Immunization, by Region	20
Table 14: Countries Responding to the UNICEF and PAHO E-Mail Surveys that Have Specific Budgetary Line item for Immunization, by Region	21
Table 15: Number of Countries Responding to the E-mail Surveys that have Introduced New Vaccines into their National Immunization Program, by Vaccine and Region	22
Table 16: Proportion of Recurrent NIP Costs Financed by National Resources, USAID Target Countries, Measles Elimination Project	26
Table 17: Distribution of Countries Responding to the UNICEF E-Mail Survey by the Share of Government Financing for Total Non-Personnel Recurrent Immunization Program Costs* (for the latest year available)	27
Table 18: PAHO Survey Respondents: Government Contribution to Routine (Non-Personnel) Recurrent and Capital Immunization Program Costs by Component ...	29
Table 19: Number of Countries Implementing Cost Recovery in the Public Health Sector, by Type of Health Care	33
Table 20: Countries Implementing Cost Recovery for Immunization Services, UNICEF and PAHO Survey Respondents	34
Table 21: Types of Cost Recovery Mechanisms used for Immunization in Countries Responding to the UNICEF and PAHO E-mail Surveys, by Region	35
Table 22: Types of Cost Recovery Mechanisms used for Immunization and Estimated Cost Recovery Rates in Countries Responding to the E-mail Surveys	36
Table 23: Level of Decision-Making for Planning and Management of National Immunization Programs, Countries Responding to PAHO E-Mail Survey	40
Table 24: Estimate of Percent of Immunizations Provided by the Private Sector, including NGOs, UNICEF and PAHO E-Mail Surveys	44
Table 25: Main Features of the PAHO Revolving Fund, VII and EU Initiative	49

List of Figures

Figure 1: Cost of Vaccine Requirements in Pacific Island Countries by Vaccine	13
Figure 2: Distribution of Countries by Government Share of Financing of Vaccines and Total Non-Personnel Recurrent Immunization Program Costs, UNICEF E-mail Survey Respondents	28
Figure 3: Mean Government share of Immunization Program Costs (Capital and Recurrent) by Component, PAHO Survey Respondents	30
Figure 4: Proportion of Countries Responding to the E-mail Surveys Reporting Provisions of Immunization Services through Private Sector Channels	45

Acronyms

AFRO	Africa Regional Office
BASICS	Basic Support for Institutionalizing Child Survival
BCG	Bacille Calmette-Guerin Vaccine
CFA	Central/West African franc
CHAL	Christian Health Association of Lesotho
CVI	Children's Vaccine Initiative
DANIDA	Danish International Development Agency
DFID	Department for International Development
DTaP	DTP with acellular pertussis
DTP	Diphtheria, Tetanus and Pertussis
ECU	European Common Unit
EPI	Expanded Program on Immunization
FIC	Fully Immunized Child
GNP	Gross National Product
HBV	Hepatitis B Vaccine
Hib	Haemophilus Influenzae Type B
IEC	Information, Education, and Communication
IPV	Injectible Polio Vaccine
LAC	Latin American and Caribbean
LGU	Local Government Unit
MMR	Mumps, Measles and Rubella
MOH	Ministry of Health
NGO	Non-Governmental Organization
NIDs	National Immunization Day
NIP	National Immunization Program
NIS	Newly Independent States
OPV	Oral Polio Vaccine
PAHO	Pan American Health Organization
PHC	Primary Health Care
PHR	Partnerships for Health Reform

REACH	Resources for Child Health
SVI	Special Program on Vaccines and Immunization (PAHO)
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VII	Vaccine Independence Initiative
WHO	World Health Organization

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Executive Summary

Introduction

This report reviews existing information on the financing and costs of childhood immunization programs in developing and transitional countries and identifies major gaps in information in this area. The issue of immunization financing has become more critical in recent years as donors have reduced their funding for immunization programs; as other health priorities, such as AIDS, compete for limited health funding; and as countries try to add new, more expensive vaccines such as Hepatitis B and *Haemophilus influenzae* type B (Hib) into their national immunization programs (often called Expanded Programs on Immunization or EPI).

This review paper is one of a series of activities that PHR has been asked to carry out under its Special Initiative on Immunization Financing, the goal of which is to “assist in the evaluation and development of country-level financing strategies for replacing donor funding and sustaining and expanding immunization programs with local resources.” PHR initially undertook this review to identify major gaps in information on immunization financing and sustainability that could be filled with targeted field research in selected countries. PHR will next conduct a series of case studies in four or more countries to obtain more in-depth information and lessons learned that other countries can use in planning sustainable financing of their immunization programs.

This paper focuses on four major aspects of immunization financing and costs: (1) the costs of immunization programs, with a focus on the costs of introducing additional vaccines; (2) financing of immunization services, including trends in government vs. donor funding, financing of new vaccines, and the use of cost recovery for immunization services; (3) the effects of a changing health sector on immunization financing, including the impact of decentralization, the role of the private sector in providing immunization, and the impact of disease eradication programs; and (4) country experiences with international mechanisms to facilitate vaccine financing, such as the Vaccine Independence Initiative (VII), the PAHO Revolving Fund, and the European Union (EU) Initiative.

Information for this review was obtained from an in-depth search of the literature and unpublished documents, consultation with experts, and a worldwide E-mail survey sent to all country offices of the United Nations Children’s Fund (UNICEF) and the Pan American Health Organization (PAHO), in collaboration with these organizations (see the survey forms in Annex B). A total of 78 survey responses were received.

Major Findings

The major findings of this review are as follows:

Costs of Immunizations:

- ▲ The literature review reveals that while a number of studies on the cost of immunization programs in developing countries were conducted in the 1980s, few have been carried out in the 1990s. The cost studies from the 1980s show that costs per fully immunized child vary widely, depending on the delivery strategy used (fixed facilities, mobile services, or mass campaigns), the local costs of personnel, and vaccine procurement and distribution. One generally accepted average cost for fixed

facilities is \$15 per fully immunized child for the traditional six EPI antigens (BCG [Bacille Calmette-Guerin Vaccine], DTP [diphtheria, tetanus and pertussis], polio, and measles vaccines).

- ▲ Although it is known that the cost per dose of newer vaccines is significantly higher than those of routine vaccines and present more of a challenge to developing countries in terms of financing, less is known about the additional operating costs (e.g., cold chain, storage, additional service delivery costs, social mobilization, etc.) of incorporating these vaccines into immunization programs.
- ▲ Information on the total recurrent costs of immunization programs (including vaccines, syringes, transport, cold chain maintenance, social mobilization, etc.)—even without personnel costs—is much less available in general than information on vaccine costs. In our survey, nearly one-half of the UNICEF survey respondents (33 countries) were not able to provide this information or obtain it from the government. This information was more available, however, in the Latin American and Caribbean (LAC) region, due to the fact that each country participating in the PAHO Revolving Fund must prepare annual action plans showing funding by source and program component.

Financing of Vaccines and Immunization Programs:

- ▲ More and more countries are financing at least a portion of their vaccine costs and many now have immunization or vaccine line items in their government budgets. In our E-mail survey sample of 78 countries, more than one-third (36 percent) reported that they finance 100 percent of their vaccine supply. As expected, there are large regional variations in the level of self-reliance in vaccine financing—while 18 of the countries surveyed in the LAC region (72 percent) reported that they are self-reliant in vaccine financing, only three countries from the Sub-Saharan Africa sample (11.5 percent) are. Three-quarters of the overall sample of countries reported having a specific immunization program or vaccine budgetary line item.
- ▲ Few countries in the E-mail survey (only four out of 78, or 5.9 percent) reported financing 100 percent of their total immunization program costs. Most countries, including better-off countries that pay for all of their vaccine supply, still depend at least to some extent on donor funding for such program support activities as training, disease surveillance, cold chain equipment and maintenance, supervision, and social mobilization. Even a relatively well-off country like Brazil received some funding from donors in 1997 for disease surveillance and training activities. However, at least part of this funding from donors, especially in the wealthier countries, may be associated with the worldwide polio eradication campaign or other international disease control efforts.
- ▲ A number of countries—especially middle-income countries—are financing the introduction of additional EPI vaccines, including Hepatitis B. Some countries, including the Pacific Island countries, Cameroon, and Bhutan, are receiving donor financing for new vaccines. There is also anecdotal evidence that some poorer countries that are receiving donor financing for traditional EPI antigens are buying additional vaccines, such as Hepatitis B and yellow fever, with government funds.
- ▲ Cost recovery for preventive health services in general was reported in only 21 countries in the survey (27 percent) and only 14 countries (18 percent) reported cost recovery specifically for immunization services. Two-thirds of the countries reporting cost recovery for immunization services in the survey are in Sub-Saharan Africa, where the Bamako Initiative is being implemented, while no country in the LAC region reported its use. Fees per immunization card or

per shot were the most common methods reported, especially in Africa. The amount of costs recovered were in most cases unknown, but where estimated were generally low (less than 5 percent of total costs).

Effects of a Changing Health Sector on Immunization Financing:

Decentralization:

- ▲ Decentralization varies widely from country to country, and the effects on immunization programs differ. Since health reforms are still being implemented, it is difficult to fully assess their effects on the financing of immunization programs.
- ▲ According to the literature, some negative consequences of the move toward decentralization of health service delivery on immunization programs are occurring as countries put new management systems into place. In order to reduce any negative effects that might occur, some change needs to take place to enable the functioning of immunization programs under decentralization to occur more smoothly. Since decentralization is accompanied by reforms that rearrange financial mechanisms, donors must also rearrange their funding mechanisms and behaviors in these countries, for instance, by targeting funding to different levels of the health system, as appropriate, and by involving local governments in determining how best to spend donated funds.

Private Sector/Non-Governmental Organization Participation in Immunization Service Provision and Financing:

- ▲ The involvement of non-governmental organizations (NGOs) in the provision of immunizations, although small, is important in many countries, particularly in Sub-Saharan Africa. However, the extent to which these NGOs provide additional resources to national immunization programs or are simply extensions of the government programs is not known. The specific composition of their clientele (e.g., urban vs. rural, better off vs. poor) is also not well documented.
- ▲ The involvement of the private for-profit sector in the provision of immunizations appears to be growing, particularly in urban areas. However, insufficient information is available on the extent of this involvement, the extent to which previously underserved populations are being served by the private sector, and whether this mechanism of distribution is increasing resources available for immunization programs.

Disease Eradication Programs:

- ▲ The few studies that have examined the impact of the worldwide polio eradication campaign on national immunization programs suggest that there have been both positive and negative effects. For example, people's knowledge of the benefits of immunizations has sometimes increased due to the extensive social mobilization efforts associated with the campaign. On the other hand, the level of resources available for routine immunization programs may have decreased. More research on this issue is required in order to determine the extent of the impact on routine immunization programs and how future disease control programs can benefit and work hand-in-hand with national immunization programs.

International Mechanisms to Facilitate Vaccine Financing

- ▲ Three international mechanisms have been developed to assist countries in increasing their financial contribution for vaccines. The oldest, begun in 1979, is PAHO's Revolving Fund, which operates

on the concept of a pooled common revolving fund and which is able to secure low vaccine prices through large volume contracts with manufacturers. The Vaccine Independence Initiative, which was established by UNICEF in 1991, sets up an individual revolving fund for each country, which then has access to low-cost, high-quality vaccines through UNICEF's procurement system. Both the PAHO Revolving Fund and the VII allow countries to buy vaccines in local currency and to pay for them only after the vaccine deliveries have been made, thereby eliminating two major obstacles—the lack of hard currency and the need to pay for vaccines in advance—that developing countries often face in purchasing vaccines on the open market. To date, all but four countries in the LAC region participate in the PAHO Revolving Fund, and 20 countries (including 12 Pacific Island countries, but not including countries participating in the VII through the European Union Initiative) currently have VII contracts. The recently developed EU Initiative, currently being implemented in seven Sahelian African countries, earmarks EU structural adjustment funding for immunization by creating an immunization or vaccine line item in each government budget and provides access to UNICEF's VII.

- ▲ According to its proponents, the EU Initiative has resulted in vaccine financing being much more secure and having a greater priority among governments in some of the world's poorest countries than has been the case in the past. The initiative has, however, been criticized for targeting the countries least able to pay for vaccines, thereby increasing the likelihood of funds being taken away from other critical immunization or health program components. Other problems attributed to the program are the lack of a mechanism to track governments' share of vaccine financing, and the lack of concrete plans to gradually increase the governments' share of financing over time.

Major Gaps in Information

This review has found that there is a considerable lack of information on many aspects of immunization costs and financing. The most salient gaps in information include the following:

Costs:

- ▲ Updated information on the costs of routine immunization programs to follow up on the cost studies conducted in the 1980s;
- ▲ Cost savings associated with greater program efficiencies;
- ▲ The additional costs of incorporating new vaccines (especially Hepatitis B, Hib, and yellow fever) into national immunization programs and the components of the additional costs of introducing these vaccines;

Vaccine and Immunization Financing:

- ▲ The proportion of total immunization program costs for which governments are actually paying;
- ▲ The impact of decreased donor funding for vaccines and immunization programs and corresponding increase of national governments' share of immunization costs on immunization coverage rates and on the overall performance and quality of immunization programs;
- ▲ The impact of adding new vaccines on the financing mechanisms and available funding for immunization programs overall (including the effect on funding for other immunization program components and/or health programs);
- ▲ The actual prevalence in developing countries of both formal and informal cost recovery for immunization services (including cross-subsidization from fees for other health services) and the actual and potential rates of cost recovery that they are achieving or could achieve;
- ▲ Information on who is and is not using immunization services in areas where cost recovery is being implemented, and the impact of cost recovery on the quality and effectiveness of these services;
- ▲ Information on whether or not cost recovery can be a valuable means of enhancing the sustainability of immunization programs and under what circumstances, and which specific cost recovery mechanisms have the most potential for mobilizing additional resources without having a negative impact on utilization;
- ▲ The prevalence and potential for financing mechanisms other than user fees to pay for the costs of immunization programs;

Effect of Changing Health Sector on Immunization Financing:

- ▲ The extent to which flows of funds in decentralized health systems are covering immunization program costs previously funded directly by the central ministry of health;
- ▲ The extent to which, and how resources have been mobilized at the local level for immunization services in countries with decentralized health systems;
- ▲ The extent to which the private sector has become involved in immunization service delivery, especially in countries with decentralized health systems, and the extent to which, if at all, participation of the NGO and for-profit sectors lowers the immunization program costs to the government;
- ▲ The impact of increased private sector participation in immunization service delivery on the equity of access to services, on coverage, and on the quality and safety of services;
- ▲ The extent to which polio eradication has affected the availability of resources for routine immunization services, and how disease control campaigns can be designed and implemented to benefit routine immunization programs and to minimize any negative effects on the management and financing of routine immunization activities;

International Mechanisms to Facilitate Vaccine Financing:

- ▲ The impact of increased government share of vaccine financing through the VII, the PAHO Revolving Fund, or the EU Initiative on countries' vaccine supplies;
- ▲ The key country or other factors that improve or hinder the success of these vaccine financing mechanisms;
- ▲ The impact of these mechanisms on the long-term sustainability of country financing of vaccines and immunization programs, especially given that the VII and EU Initiative were conceived as short-term measures;
- ▲ How each of these mechanisms can be improved to minimize vaccine shortages, ensure the long-term sustainability of vaccine and immunization program financing, and ensure that increased government funding of vaccines does not result in inadequate funding of critical immunization program components;
- ▲ Other barriers to the long-term sustainability of country financing of immunization programs that these mechanisms are not addressing;
- ▲ Information on countries' experiences with direct procurement of vaccines and under what circumstances direct procurement is more beneficial to countries than participation in one of these mechanisms;
- ▲ Information on countries' experiences with using World Bank or other loans to finance vaccines and national immunization programs, and the impact of these loans on the long-term sustainability of immunization programs;
- ▲ Information on whether or not vaccine wastage and other inefficiencies have been reduced as a result of increased government share of vaccine financing;
- ▲ Whether there are other potential mechanisms, such as endowments and trusts, that could be attempted to improve the long-term sustainability of country financing of vaccines and immunization programs.

1. Background and Methodology

1.1 PHR's Special Initiative on Immunization Financing

In recent years, national governments and the international health community have become increasingly concerned with the issue of financing vaccines and immunization programs. Despite tremendous gains in immunization coverage in the 1980s in nearly all developing countries with the establishment of national Expanded Programs on Immunization (EPI)—now often called national immunization programs (NIPs)—coverage rates in the 1990s have plateaued or even declined in a number of countries—especially in Sub-Saharan Africa—as donors reduce their funding for immunization, as national health budgets decline with deteriorating economic conditions, and as other health priorities, such as HIV/AIDS, consume increasing attention and limited health funds (Taylor, Baer and Pyle, 1996).

The introduction of additional vaccines, including Hepatitis B and *Haemophilus influenzae* type B (Hib),¹ into national immunization programs has also been delayed in many countries, due at least in part to the high costs of these vaccines relative to the pennies-per-dose costs of the six traditional EPI antigens.² According to the coordinator of the inter-agency Children's Vaccine Initiative (CVI), “sustainable financing of current and new vaccines is the biggest problem facing immunization today. Unless we can develop new solutions and new attitudes toward the funding of vaccination, all of the advances in science and all of the investment to establish the delivery infrastructure will have no further value to most of the world's children.”³

In 1996, the Child Survival Division of the United States Agency for International Development's (USAID) Office of Health identified vaccine financing and sustainability as a priority issue to address, and began discussions with the Partnerships for Health Reform (PHR) Project on how the project could contribute to this issue. USAID and PHR, with the support of the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), agreed that PHR's role would be to assist in assessing and, if possible, developing and testing various financing and resource allocation strategies at the national level that countries can use, as appropriate, to sustain and expand their immunization programs. Some of these strategies include:

- ▲ reducing vaccine costs through a tender and bid process, the use of the UNICEF or Pan American Health Organization (PAHO) procurement system, and/or increasing local production of vaccines;
- ▲ securing good credit terms and low-cost, high-quality vaccines through participation in the Vaccine Independence Initiative (VII), the PAHO Revolving Fund or the European Union (EU) Initiative;
- ▲ earmarking funds in ministry of health (MOH) budgets for immunization programs;

¹Which protects against meningitis and pneumonia caused by the pathogen *haemophilus influenzae* type B, one of the leading causes of childhood pneumonia and non-epidemic meningitis.

²BCG (Bacille Calmette-Guerin [against tuberculosis]), DTP (diphtheria, tetanus and pertussis), oral polio vaccine, and measles

³Letter of 25 August 1997 from Roy Widdus to Dr. Steven Landry of USAID.

- ▲ assuring maintenance of adequate funding for immunization programs in decentralized health systems;
- ▲ including immunization coverage in social insurance (e.g., social security) programs;
- ▲ cost containment and efficiency measures to reduce costs of immunization programs, reduce wastage, etc.
- ▲ changing the mix of public-private providers for immunizations (e.g., by providing incentives to non-governmental organizations (NGO) and the private for-profit sector, such as free vaccines);
- ▲ increasing MOH budgets for immunization, to include forecasts of the future costs of introducing new vaccines and new immunization technologies;
- ▲ developing new financing mechanisms for immunization, such as pre-payment or insurance mechanisms, user fees, and cross-subsidization (i.e., user fees for curative care services channeled to immunization activities).

The goal of PHR's immunization financing initiative is to assist in the evaluation and development of country-level financing strategies for replacing donor funding and sustaining and expanding immunization programs with local resources. To achieve this goal, PHR is carrying out the following activities, in collaboration with WHO, PAHO, and UNICEF:

1. Conduct a review of information and lessons learned concerning the financing and costs of immunization programs, based on a literature review and an E-mail survey to UNICEF and PAHO country offices;
2. Conduct case studies in four to five countries to assess financing strategies that countries are using for their immunization programs, including the introduction of new vaccines; examine the impact of new challenges, such as reduced donor funding for immunization, decentralization, and other health sector reforms on financing of immunization programs; and provide recommendations to the countries on how to improve their current financing strategies. Case studies are planned or currently underway in Morocco (in collaboration with WHO), Colombia (in collaboration with PAHO), Bangladesh, and Senegal;
3. Develop and disseminate tools, such as a menu of immunization financing options and an immunization financing assessment tool, to assist countries in selecting appropriate financing and resource allocation strategies for their immunization programs. These tools will be based on the experience and lessons learned from the country case studies.

The expected “intermediate result” of this initiative (for USAID purposes) is “increased capacity of national decision-makers and the international health community to plan and implement sound financing strategies to sustain and expand immunization programs.”

1.2 Purpose and Structure of this Review Paper

This review is a first step in gathering information on the financing of national immunization programs. The purpose of the review is to inform the design of the country case studies that PHR will carry out by:

- ▲ summarizing existing information and lessons learned on the costs and financing of immunization programs at the country level, and on the introduction of additional vaccines, and
- ▲ identifying critical gaps in information concerning immunization financing.

It should be noted that this paper is not an extensive or comprehensive review of immunization financing in developing countries, but rather an overview of information that could be obtained in a relatively short period of time and with limited resources. The country case studies will, however, provide the opportunity to explore in-depth some of the issues that this paper touches upon and to fill in some of the gaps in information that it identifies, as they apply to the case study countries.

This paper will review available information in four main areas:

- ▲ the costs of immunization, including the costs of incorporating additional vaccines into national immunization programs (Section 2.1);
- ▲ financing of country immunization programs, including trends in government vs. donor funding of vaccines and national immunization programs, the financing of new vaccines, and the use of cost recovery for immunization services (Section 2.2);
- ▲ the effects of a changing health sector on immunization financing, including the impact of decentralization, the role of the private sector in providing immunization, and the impact of disease eradication programs (Section 2.3); and
- ▲ country experiences and lessons learned concerning international mechanisms to facilitate vaccine financing, including the Vaccine Independence Initiative, the PAHO Revolving Fund mechanism, and the new European Union Initiative (Section 2.4)⁴.

Some of the questions that this paper will try to answer are:

- ▲ What are the trends in financing for immunization programs? What is the mix of financing sources?
- ▲ How dependent are countries on donors to finance immunization programs? What types of costs are donors primarily covering?
- ▲ What has been the impact of reduced donor funding for routine immunization on these programs?
- ▲ What has been the impact of introducing additional vaccines on the cost and financing of immunization programs? How are countries financing the additional vaccines?
- ▲ To what extent is cost recovery or other alternative financing mechanisms being used for immunization services? What types of mechanisms are being used and what rates of cost recovery are being achieved?

⁴Note that other international financing mechanisms, including World Bank loans and direct procurement of vaccines on the international market, are not covered in this paper, as discussed in Section 1.3

- ▲ What is the private sector's contribution to the provision of immunization services? Are governments providing incentives to the private sector to deliver immunization, and, if so, how are they working?
- ▲ What has been the impact of polio eradication programs on the financing and costs of routine immunization programs?
- ▲ How successful have the various mechanisms to facilitate vaccine financing (e.g., PAHO's Revolving Fund, the VII, the EU Initiative) been in increasing countries' self-sufficiency in vaccine supply?
- ▲ What has been the impact of these mechanisms on: countries' vaccine supply, the coverage and quality of immunization programs, the availability of funds for other components of immunization programs, and funding for key health program inputs?
- ▲ Which of these mechanisms have been the most successful and why? What key country and other factors affect their success?

1.3 Methodology, Data Sources, and Limitations of this Review

Information for this review was collected from two main sources: (1) documents, both published and unpublished; and (2) an E-mail survey sent to the country offices of UNICEF and PAHO in collaboration with these organizations. Documents reviewed for this paper include published articles and books; technical reports, strategic plans, and other documents from UNICEF, WHO's Children's Vaccine Initiative, PAHO, the Basic Support for Institutionalizing Child Survival (BASICS) Project, and the the Resources for Child Health (REACH) Project; and WHO position papers. Immunization program cost data from WHO's Africa Regional Office (AFRO) and UNICEF data on governments' share of vaccine costs were also reviewed. A list of references included in this review is presented at the end of this document.

The E-mail survey conducted through UNICEF consisted of questions in three main areas: (1) funding sources for immunization programs (government vs. donors), (2) cost recovery for immunization, and (3) the involvement of the private health sector in the provision of immunization services. To ensure a high response rate, the questionnaire was kept short and thus does not provide much detail on these issues. The survey conducted through PAHO provides more detailed information, including information on trends in government's share of financing for immunizations, costs and funding source by program component (e.g., vaccines, cold chain, training, etc.), destination of locally generated funds, and the degree of decentralization for immunization programs. Both survey forms are shown in Annex B.

Table 1. Response Rate of Countries to UNICEF and PAHO E-mail Surveys by Region

Region	No. of Countries Surveyed	No. of Responses	%
Asia/Pacific*	19	10	52.6
Eastern Europe/NIS	16	11	68.8
Latin America/Caribbean	36	25**	69.4
Middle East/North Africa	13	6	46.2
Sub-Saharan Africa	47	26	55.3
Total	131	78	59.5
* All 12 Pacific Island countries are counted as one country in the survey, since one form was completed for all of them.			
**Responses from the LAC countries either through PAHO or UNICEF (countries in which both organizations responded are counted only once).			

Table 1 shows the rate of response to the survey by region and a list of all countries responding to the two surveys is shown in *Table 2*. The overall response rate of both surveys was 59.5 percent, which is quite high, considering that both surveys were voluntary. The response was strongest in the Latin America and Caribbean (LAC) and Eastern Europe/New Independent States (NIS) regions, and weaker in the Middle East/North African region. Although some large countries, including China and Russia, did not respond to the survey, responses were received from other large countries, including India, Indonesia, Brazil, and the Philippines. A total of 10 countries responded to the more in-depth PAHO survey, although a number of LAC countries responded to the survey conducted through UNICEF.

In interpreting the data from the surveys, the reader should keep in mind that, although this paper presents the data in terms of country responses as a percent of the total number of countries surveyed in each region, the countries that responded to the surveys are not necessarily representative of all countries in their region or in the world. Since this survey was conducted through UNICEF, there is also the possibility that UNICEF representatives in countries that have been most successful in assuming greater responsibility for financing their vaccines and other program costs may have been more likely to respond to the survey than representatives in other countries.

There are a number of other limitations in the scope and depth of this review. First, several countries that could provide important information on immunization financing and costs, did not respond to the E-mail survey. These countries include Afghanistan, Bangladesh, Uganda, Zimbabwe, Romania, and the United Arab Emirates. Secondly, although it is presumed that the UNICEF and PAHO country offices responding to the survey obtained the financing and other information requested directly from national ministries of health, it is not certain if this was always the case or to what extent they had access to necessary data to obtain estimates on total recurrent immunization budgets and other requested information. The brevity of the E-mail survey, especially the one administered through UNICEF, also limits the amount and depth of information. In addition, cost and financing data from both the surveys and from UNICEF tables are based on government budgets and not on actual expenditures. Since government expenditures often fall short of planned budgets as a result of financial difficulties in the country or the shifting of funds to other programs, the budgetary figures in this report may, in some cases, tend to overestimate governments' actual financial contribution to vaccine and immunization program costs.

Finally, due to the limited time constraints and the difficulty obtaining certain information, this review does not present information on two important methods of funding immunization programs or vaccines: (1) countries' experiences with World Bank or other loans to help finance immunization programs; and (2) countries' experiences with direct procurement of vaccines on the open market (e.g., through an international tender and bid process). The latter topic is especially important in terms of the long-term sustainability of immunization programs.

Table 2. Countries Responding to the UNICEF or PAHO Email Surveys

Asia/Pacific	Bhutan, Cambodia, India, Indonesia, Laos, Mongolia, North Korea, Pacific Islands, Phillipines, Sri Lanka
Eastern Europe/NIS	Albania, Armenia, Bosnia-Herzegovina, Croatia, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turmenistan, Uzbekistan, Yugoslavia
Latin America/Caribbean	Antigua and Barbuda, Argentina, Barbados, Bolivia*, Brazil, British Virgin Islands, Colombia*, Costa Rica, Cuba, Dominica, El Salvador*, Grenada, Guatemala, Honduras*, Mexico, Nicaragua*, Panama*, Peru*, St. Kitts and Nevis*, St. Lucia, St. Vincent and Grenadines, Suriname*, Trinidad and Tobago, Turks and Caicos
Middle East/North Africa	Algeria, Iraq, Lebanon, Oman, Tunisia and Yemen
Sub-Saharan Africa	Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Comoros, Djibouti, Equatorial Guinea, Ethiopia, Guinea, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Mozambique, Niger, Nigeria, Rwanda, Senegal, Somalia, South Africa, Sudan, Togo, Zambia
* PAHO survey respondents	

However, several of the country case studies that PHR is carrying out will provide in-depth information in these areas, in particular Morocco's experience with World Bank funding and Colombia's experience with direct procurement of vaccines.

2. Findings

2.1 Costs of National Immunization Programs

2.1.1 Introduction

Determining the costs of immunization programs and the costs of incorporating additional vaccines into a program is an important component of any analysis on financing of national immunization programs. Cost analysis allows policymakers and program managers to determine the total costs of an NIP package as well as the additional costs associated with incorporating “new”⁵ vaccines, such as Hepatitis B, Haemophilus influenzae type B (Hib), yellow fever, and the upcoming rotavirus vaccine, into an existing immunization program. It also highlights areas of potential program inefficiencies. In resource-constrained countries, the additional costs of incorporating new vaccines into a country program are an important consideration in deciding whether or not to proceed with their use.

Three kinds of cost studies are conducted when estimating the costs of immunization programs: (1) analyses of total costs of a program or additional costs associated with the introduction of new vaccines, (2) cost-effectiveness studies that compare service delivery strategies, and (3) cost-benefit analyses that investigate whether the benefits of an immunization outweigh the costs of providing and obtaining it. This section includes a discussion of methodological issues in costing of immunization programs, a summary of findings from studies on immunization costs, a synopsis of research on the impact of the introduction of additional vaccines on costs of immunization services, and a summary of the findings of the cost-effectiveness and cost-benefit studies.

2.1.2 Methodological Issues in Costing of Immunizations

Several studies have been conducted to estimate the costs of immunization programs and services, from investigations of the total costs conducted in the late 1970s to more recent studies that examined the cost-effectiveness of different service delivery approaches. However, there are differences in the methodologies employed that make comparison of the results between countries and among studies difficult. One difference involves how the costs of the various immunization program components are classified. The cost components often differ between analyses, are estimated, and are based on incomplete information (Kaddar and de Champeaux, 1994). A second issue is the problem of joint costs, or costs of resources that are shared among different services. Methods of allocating shared costs, such as vehicles and rental charges, vary widely among different services, with different assumptions made in order to allocate these costs. Another methodological problem is in how a “fully immunized child (FIC)” — the most common measure of cost-effectiveness of

⁵Although many vaccines that are currently being added to national immunization programs were developed and have been on the international market for some time, this report uses the term “new” to distinguish them from the traditional six EPI antigens.

immunizations—is defined. In some cases, it includes all children fully immunized, regardless of age, while in others, it refers only to children who are fully immunized by the age of one year.

The cost per FIC may also differ due to economies of scale or service delivery strategy. The cost may be lower in a large country than in a small one, given economies of scale in the costs of specific components. That is, some fixed costs, such as personnel time (for personnel fully dedicated to immunization) and some kinds of equipment, will remain the same as the number of immunizations provided increases, and the cost per FIC will decrease. The cost per FIC also depends on the size of immunization sessions and varies by service delivery strategy, including the type and timing of the vaccines administered, the frequency of the sessions, and the level of integration of activities with other health programs.

One way around some of the difficulties of establishing total costs of immunization programs is to assess the additional cost of providing more services under the existing programs or providing a new immunization service, rather than estimating total costs. However, this may be difficult if most of the additional costs consist of donations from external organizations (Kaddar and de Champeaux, 1994). Additionally, while decisions on the most cost-effective strategies are best made at the margin, it is difficult to obtain the data to make this comparison, since the extensive data required, such as information on the same program and strategy for alternative levels of operation, are usually not available. For this reason, studies usually examine average costs of an immunization program, or the costs of the additional service.

Another problem in doing a cost analysis is that the quality of the cost estimates often differs considerably, depending on the number of assumptions that are made, the sources of the data, and the thoroughness of the analysis.

2.1.3 The Costs of Immunization Programs

Several studies were conducted to determine the costs of national immunization programs in developing countries. In general, early studies (Barnum, 1980; WHO, 1980; Creese, 1982⁶; WHO, 1985) found that the cost per FIC ranged between US\$5 and US\$15⁷, and these data were used to justify additional financial support from donors for immunization programs (Brenzel, 1991) (see *Tables 3 and 4*). Other studies have found that the cost of fully immunizing a child averages between \$10 and \$20. The costs per FIC have been found to be higher in certain countries, such as Colombia (*Table 3*), and for mobile teams and campaign strategies compared with fixed strategies (*Table 4*). It should be noted, however, that few studies estimating the costs per FIC have been conducted since the 1980s.

Other studies have investigated the cost-benefit or cost-effectiveness ratio of specific immunizations in order to justify their inclusion in immunization programs (Ponnighaus, 1980; Shepard et al., 1986; Asensi et al., 1995) (see *Table 5*). The Ponnighaus and Shepard studies examined the cost-benefit analysis of measles vaccine, since it has a higher cost-per-dose and greater heat sensitivity than the other EPI vaccines. Despite the use of different methodologies, both studies found the measles vaccine to have a high benefit-cost ratio due to the substantial disease burden and high case fatality rate of measles.

Table 3. Findings from Studies on Costs per Fully Immunized Child

⁶Creese, A. and Henderson, R. 1982 "Cost-Effectiveness Appraisal of Immunization Programs." WHO Bulletin 60(621-632), cited in Brenzel and Claquin, 1994.

⁷All dollar amounts in this report are in U.S. dollars.

Author	Country	Mean or Median Costs per Fully Immunized Child
WHO (1980)	Thailand (1979)	\$7.76
WHO (1981)	Indonesia	\$2.04*
WHO (1985)	Sri Lanka (1984)	municipal: \$4.94-\$7.15 MOH: \$2.68-\$4.84 Estate: \$4.50-\$6.00
Creese (1986)	Colombia	facility: \$26.59 campaign: \$59.90
<p>*Does not include measles vaccine. Sources: WHO, 1980, 1981 and 1985; Creese, 1986.</p>		

Table 4. Cost per Fully Immunized Child by Service Delivery Strategy

Strategy	Country	Total Cost (Current \$)	Cost/FIC (Current \$)	Cost/FIC (1992\$)
Fixed Facilities	Tanzania (1987)	\$ 4,571,000	\$ 6.53	\$ 8.09
	Mauritania (1985)	\$ 83,970	\$ 6.83	\$ 8.94
	Philippines (1988)	\$16,390,108	\$13.29	\$15.83
Mobile Teams	Mauritania (1985)	\$ 357,880	\$17.37	\$22.74
	Burkina Faso (1987)	\$ 47,065	\$ 12.71	\$15.74
Campaigns	Mauritania (1985)	\$ 228,715	\$ 8.97	\$11.74
	Senegal (1987)	\$ 5,108,071	\$20.03	\$24.81
Source: REACH Project, 1990.				

Table 5. Findings from Studies on Cost-Effectiveness and Cost-Benefit of Vaccines

Author	Country	Vaccine	Cost Analysis Indicator
Ponnighaus (1980)	Zambia	Measles	1/(3.9-4.4)*
Shepard (1986)	Cote D'Ivoire	Measles	1/(9.8-11)*
Asensi (1995)	Spain	Hib	202,000,000** vs. 135,000,000***
Jönsson et al. (1991)	Spain	Hepatitis B	7,700** vs. 7,200***
<p>* cost-benefit ratio ** cost in pesetas of invasive disease *** cost in pesetas of vaccination</p>			

Methodologies were developed by WHO for costing of immunization programs out of its early costing work, including the EPI Costing Guidelines (WHO, 1979) and a computerized costing model, EPICost, developed in 1988. This methodology included a method for allocating primary health care facility resources, and it specified data sources for cost information. Effectiveness measures were obtained through immunization coverage surveys using the 30-cluster sampling technique. Although EPICost was used in a few countries, it was not used widely due to the extensive data requirements and large number of assumptions that limited the usefulness of the model.

Since the mid-1980s, several studies of the cost-effectiveness of immunizations have been conducted by the REACH project and others using the WHO methodology (see *Table 5*). These studies looked at three issues: (1) comparison of different service delivery strategies, (2) national cost assessments, and (3) the management of national immunization programs. The general findings are the following: (1) routine delivery of services is less costly per FIC than mobile teams or campaigns, (2) the majority of costs are due to salaries and capital costs, and (3) the higher the utilization of services, the lower the cost per FIC. The breakdown of recurrent costs associated with immunization programs estimated in these studies indicated that personnel costs comprise about 40 percent of total costs, vaccines approximately 10-15 percent⁸, and supervisory costs about 20 percent. Other costs, such as transport costs, vary with the strategy and the size of the country (Chevallier, 1989; Brenzel and Claquin, 1994).

More recent studies have addressed managerial concerns by investigating cost variations within countries (see *Table 6*). In general, as expected, the greater the number of children immunized, the lower the cost per fully immunized child. In addition, in studies of programs in countries such as Thailand, it was found that when fewer immunization sessions were offered, the cost per FIC decreased because of lower vaccine wastage and higher attendance (Phonboon et al., 1989). In Kenya, the findings of two studies indicated that better use of existing resources is required to lower costs (Bjerregaard, 1990; Fiedler, 1992).

Table 6: Findings from Cost-Effectiveness Studies of Immunization Programs with Managerial Implications

Author	Country (Year)	Range of Cost/FIC	Recommendations
Phonboon et al.	Thailand (1989)	\$5.30-\$33.20	Decrease frequency of services offered
Bjerregaard	Kenya (1990)	\$12.39	Reduce the dropout rates and vaccines wastage; fully immunize more children with same staff
Fiedler	Kenya (1992)	\$13.05-\$15.35	Adopt policy of consolidation rather than opening new facilities

The reasons for the cost variation in these studies is related to several factors: (1) different estimating methodologies, (2) different delivery strategies, (3) different population densities, and (4) large variation in personnel costs/wages and vaccine distribution/supply costs. A cost-outcome matrix for immunization services, shown in *Table 7*, has been developed to explain why costs of immunization services can vary considerably within the same country.

⁸ Vaccine costs were higher in places where injectable polio vaccine (IVP) was used.

Table 7. Example of a Cost/Outcome Matrix for Immunization Services

	HIGH COST	LOW COST
	Case 1	Case 2
Above Average Outcome	<ul style="list-style-type: none"> ▸ Frequent sessions per month, often returning to HQ for supply ▸ Scattered population serviced by many outreach points ▸ Long distances and high fuel costs ▸ High utilization rates 	<ul style="list-style-type: none"> ▸ Frequent sessions per month, with one resupply per month ▸ No stock-outs ▸ Densely settled population served by few outreach points ▸ Small team of health workers coordinates with community ▸ Community enumerates the eligibles and follows up ▸ High utilization rates
	Case 3	Case 4
Below Average Outcome	<ul style="list-style-type: none"> ▸ Size of team exceeds that needed for the workload ▸ Location of health posts does not cover target population ▸ High session frequency ▸ Poor quality cold chain ▸ Vaccine spoiled (hot or frozen) ▸ Stock-outs ▸ Low utilization and ineffective follow-up 	<ul style="list-style-type: none"> ▸ Small team of multi-skilled health workers ▸ Location of outreach sites does not maximize access for target population ▸ Few sessions per month ▸ Stock-outs lead to incomplete or interrupted services ▸ Low percentage of eligibles is contacted; no follow-up

Source: Foster et al, 1998.

2.1.4 The Additional Costs of Introducing Vaccines into Immunization Programs

2.1.4.1 Additional Costs of the Vaccines

In general, the cost-per-dose of the newer vaccines, such as Hepatitis B and Hib, is considerably higher than those of the traditional EPI antigens. The higher prices are largely due to the characteristics of the market for vaccines: the high development costs for new vaccines and small number of companies involved in vaccine production.⁹ Three firms are responsible for 75 percent of total sales of vaccines and, in the past, these firms have segmented the market into UNICEF/PAHO and other purchasers. This price-tiered system is likely to continue, since purchasers such as UNICEF continue to negotiate lower prices from manufacturers for vaccines such as Hib.

For many of the additional vaccines, such as Hepatitis B, the procurement prices per dose vary widely across and within countries. The price is lower in the public sector than in the private sector, in larger

⁹ It is also affected by the number of patents restricting new producers from using registered production techniques until they are out of patent.

countries where bulk purchases can be made, and in developing countries than in industrialized countries. Four tiers of prices can be distinguished for the procurement of vaccines, ranging from high to low:¹⁰ (1) the private sector in industrialized countries, (2) the public sector in industrialized countries, (3) the private sector in developing countries, and (4) the public sector in developing countries. In addition, the price depends on the procurement mechanism, such as the UNICEF or PAHO procurement systems. For example, when a country buys the Hepatitis B vaccine through UNICEF, UNICEF helps to negotiate a price with the manufacturer for that specific country. An additional factor in the price of Hepatitis B vaccine is the type of vaccine purchased; the DNA recombinant vaccine tends to be more expensive (\$0.57 to >\$10.00 per dose) than the plasma-derived vaccine (<\$0.50 to \$1.25 per dose). Another factor is the skill with which the international tender and bid is conducted.

One way to lower the costs of introducing new vaccines is with the use of combination vaccines. These combinations involve fewer costs than separate vaccines, since they require less packaging and supplies; therefore, it is likely that cost savings will be obtained by using combinations. Some newly licensed combinations are DTP-Hib, DTP-HVB, DTP-Hib-HVB, DTaP, DTaP-IPV, and DtaP-Hib. Countries that have introduced or are considering introducing DTP-HBV are Zimbabwe and Thailand (Madrid, 1998a and 1998c).

Although WHO has recommended the introduction of Hepatitis B into all countries' national immunization programs since 1992, only a few countries with per capita incomes under \$500 have done so, due in part to the high cost of the vaccine (see *Table 8*).¹¹ The cost per completed series of Hepatitis B vaccine can be as high as \$24 or higher in some countries. A study in Moldova estimated that adding Hepatitis B vaccine using the open vial policy would increase the total expenditure for all vaccines by 2.4 times if single dose vials are used, while using 10-dose vials would raise it by 1.9 times (Feilden, 1995b). Data from the Pacific Island countries, where Hepatitis B has been incorporated into all country immunization programs, show that the cost of the vaccine makes up almost half of the total cost of all childhood vaccines combined (see *Figure 1*).

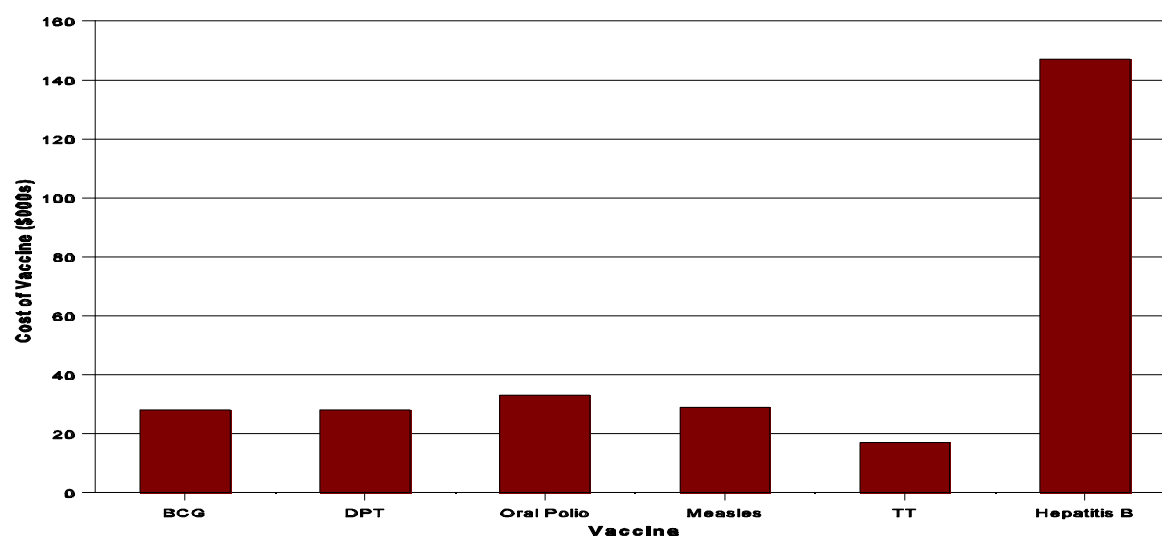
Table 8: Additional EPI Vaccines: Cost, Schedule and Number of Doses Required*

Vaccine	Vaccine Cost per Completed Primary Series	Schedule/No. of Doses
Hepatitis B	\$1.20 to >\$24.00	3 times the first year
Yellow Fever	\$0.17	1 time at 9 months
Hib	\$10.05** to >\$45.00	3 times the first year
<p>*Other costs that are not included here are wastage, handling charges, and supplies such as syringes.</p> <p>**The current PAHO EPI Revolving Fund unit cost with a pre-filled syringe is \$3.35.</p> <p>Source: WHO/UNICEF, 1996</p>		

¹⁰ In some cases, the order of two and three is switched.

¹¹ Another factor that affects the introduction of Hepatitis B are rules of organizations such as UNICEF that restrict country offices from raising funds for Hepatitis B in Band A countries.

Figure 1: Cost of Vaccine Requirements in Pacific Island Countries by Vaccine



Source: UNICEF Survey data.

Other vaccines that are being added to the immunization programs, such as yellow fever, are less costly. The yellow fever vaccine, developed in 1937, costs less than \$0.20 per dose and only requires one dose every 10 years. It has been introduced in 16 at-risk countries in Africa and several countries in the LAC region since 1990 (WHO/UNICEF, 1996). However, the introduction of this vaccine into national immunization programs in Africa has been spotty; only in three African countries (Burkina Faso, the Central African Republic, and The Gambia) do coverage levels exceed 50 percent (WHO Website, 12/98).

2.1.4.2 Total Additional Costs of Adding New Vaccines

Besides the additional costs of the vaccine, other costs associated with introducing a new vaccine are those of delivering the vaccines. These additional costs are listed in *Table 9*. The delivery costs should increase with the addition of each new vaccine, although the costs should be minimal if a combination vaccine is introduced that is partially made up of a vaccine already in the program. The additional costs include those of training health workers in administering the new vaccine, storage and cold chain logistics; supplies such as syringes; and those associated with social mobilization or information, education and communication (IEC) campaigns to introduce the population to the benefits of the new vaccine. In addition, other service delivery costs will be incurred if the vaccine must be administered at a different schedule than the traditional EPI vaccines, or if the target population differs from that of the traditional immunization program.

Only a limited number of studies—mainly in developed countries—have been conducted to determine the added costs of introducing new vaccines into immunization programs. These studies range from those that investigate the additional costs to the program of incorporating the newer vaccines to those that test different modes of service delivery (e.g. Antoñanzas et al., 1995). However, a study of the cost of introducing the Hib vaccine into a national immunization program is currently underway in The Gambia.

Table 9: Possible Elements Requiring Additional Costs for the Introduction of New Vaccines into National Immunization Programs

▲	Vaccines
▲	Supplies
▲	Training
▲	Cold Chain and Vaccine Logistics*
▲	Social Mobilization and IEC
▲	Service Delivery Costs associated with:
△	Target Population
△	Schedule
△	Coverage

*The additional costs also depend on existing cold chain and storage capacity for the vaccines.

Some studies have investigated the effect of including new vaccines in immunization programs on cost per FIC (*Table 10*). These studies examined the service delivery costs as well as the costs of the vaccine. One study in The Gambia (Robertson et al., 1992) found that the inclusion of the yellow fever vaccine increased the cost per fully immunized child from \$5.64 to \$6.42, an increase of 14 percent.¹² A World Bank analysis estimated an increase of 15 percent in cost per FIC as a result of adding Hepatitis B and yellow fever vaccines and selected micronutrients to the standard EPI package (World Bank, 1993). This estimate is probably low and may not include some of the additional costs of service delivery associated with implementation of this package. In addition, it is a global average, and masks a wide range of real world costs for countries in different situations.

In conclusion, even though information on the service delivery costs of incorporating additional vaccines into immunization programs is limited, it is clear that the vaccine costs are higher due to the unit prices charged by manufacturers for these vaccines. The magnitude of the effect of the introduction of these vaccines on operational costs is less clear. Because of the high costs of the new vaccines, it is likely that, at a minimum, new vaccine financing strategies are required by developing countries in order to finance their inclusion.

¹²However, total costs had decreased substantially from the earlier cost per FIC of \$19 found in an earlier study in The Gambia (Robertson, Davis and Jobe, 1984), which did not include the yellow fever vaccine. The decline in costs per FIC was attributed to improvements in the management of the country's immunization program.

Table 10: Increase in Cost per FIC Associated with Introduction of Additional Vaccines (and Micronutrients)

Author	Vaccine	Increase in Cost/FIC
Creese (1986)	Rotavirus	Raises the costs of FIC by \$0.39-\$5.10
Robertson (1992) (The Gambia)	Yellow Fever	Increases the costs from \$5.64 to \$6.42 (14 percent increase)
World Bank (1993)	Hepatitis B and yellow fever vaccines, Vitamin A and iodine supplements	Adds 15 percent to the cost/FIC
Sources: Creese, A., 1986; Robertson, R.L., et al. 1992; World Bank, 1993.		

2.1.5 Gaps in Information on the Cost of Immunization Programs

Some of the questions that remain to be answered both concerning the overall costs of immunization programs and the cost of adding newer vaccines are the following:

- ▲ What are the costs of routine immunization programs in the 1990s?
- ▲ What are the cost savings associated with greater program efficiencies?
- ▲ What are the additional costs associated with the introduction of new vaccines into national immunization programs?
- ▲ What are the components of the additional costs of introducing vaccines to immunization programs?
- ▲ Is the cost profile of new vaccines different from those of the traditional EPI vaccines?

2.2 Financing of Immunization Programs

This section will examine available information on how developing and transitional countries are financing their immunization programs. It will focus on the following areas:

- ▲ trends in national and international financing of vaccines and immunization programs in general, including the introduction of additional vaccines into immunization programs;
- ▲ the status and trends of cost recovery and other alternative financing mechanisms for immunization services; and
- ▲ the effects of major health sector changes and trends on immunization programs and immunization financing. The health sector trends examined are decentralization; the growing participation of the private sector in the delivery of primary care services, including immunization; and disease eradication programs (e.g., polio eradication) and their impact on national immunization programs and financing.

2.2.1 National Government and Donor Financing of Vaccines and National Immunization Programs

During the 1980s, when the Universal Child Immunization initiative was undertaken, international donors, especially UNICEF and bilateral governments, heavily funded the development and expansion of national immunization programs throughout the developing world. This assistance peaked around 1990, the year the goal of 80 percent worldwide coverage for the basic EPI immunizations was attained, and has plateaued, or in some countries, actually declined since then (Taylor et al, 1996). Governments have also been under increasing pressure from multilateral agencies and donor countries to pay a greater share of the cost of routine EPI vaccines.¹³ This section will examine the status and trends in government vs. donor financing of vaccines and of national immunization programs overall.

2.2.1.1 Financing of Vaccines

In 1995, UNICEF supplied to developing countries 1.2 billion doses of vaccines, which represented an estimated two-thirds of the world's total consumption (Guerin and Rey, 1996). Sixty-five percent of this amount was financed by donors, and the remaining 35 percent were sold to government EPI programs (BASICS, 1997). Faced with declining donor funding for immunization at the same time that vaccine demands of developing countries were increasing—including the demand for new, relatively expensive vaccines—UNICEF and WHO developed a strategy in 1994 of targeting assistance for vaccines to countries based on their income level and population size. All countries were grouped into one of four bands, with band A countries being the poorest and smallest and band D the wealthiest. The overall goal of this “banding” strategy is to encourage government financing of vaccines in countries that are able to pay for all or part of their vaccine needs, in order to target limited donor assistance to the poorest countries. Another original aim of the banding strategy was to encourage vaccine producers to apply tiered pricing policies, both for the tradition EPI antigens and for newer vaccines.

The target of this strategy was for B and C countries (e.g., Indonesia, Philippines, Thailand, India, Botswana) to become self-sufficient in financing their routine EPI vaccine supply as soon as possible—by purchasing directly on the open market, purchasing through UNICEF's procurement system, and/or increasing their own vaccine production. The target for band B countries (e.g., Bangladesh, Egypt, Nigeria, Morocco, Cameroon, Senegal) was for them to finance 80 to 100 percent of their routine vaccine needs within four years (starting in 1994). Band A countries (e.g., Lao People's Democratic Republic [Lao PDR], Haiti, several Sub-Saharan African countries) would continue to receive donations for the majority of their vaccine needs, but would be encouraged to finance 10 to 25 percent of their routine vaccine supply. To assist countries in increasing their financial contribution for vaccines, countries, especially those in Bands A and B, would have access to UNICEF's procurement system to allow them to purchase low-cost, high-quality vaccines. In addition, two existing vaccine financing mechanisms—the UNICEF/WHO Vaccine Independence Initiative and PAHO's Revolving Fund, which allow countries to buy vaccines through those agencies with local currency and which provide favorable credit terms—could be accessed. These mechanisms are described more fully in Section 2.4.

¹³Routine EPI vaccine supply refers to vaccines used for regular immunization activities and does not include supplemental vaccines used for disease control campaigns, such as polio eradication and measles elimination efforts, which are heavily donor-funded.

Recent data do show an overall marked increase in vaccine financing by national governments in the last several years, as a result of decreases in donor funding and increased pressure from international donors and multilateral agencies. According to the CVI, between 1990 and 1997, the proportion of Band A countries paying at least some portion of their vaccine needs increased from 2 percent to 25 percent (CVI, 1997b). For Band B countries, the proportion rose from 40 percent to 70 percent, and for Band C, from 80 percent to 90 percent during these years.¹⁴ As for countries meeting the targets of vaccine cost sharing set for each band, UNICEF estimates that in 1997, 26 percent of Band A countries had reached a target of 25 percent financing of their routine vaccine supply, 62 percent of Band B countries were financing 100 percent of their routine needs, and 82 percent of Band C countries had reached 100 percent financing (Polsky, UNICEF, personal communication). Viewed another way, by 1997, 97 percent of all vaccines supplied to Band C countries, 84 percent of vaccines in Band B countries, and 17 percent of vaccines in Band A countries were financed by national governments (UNICEF, 1997b). *Table 11*, from data that UNICEF now collects yearly for its *State of the World's Children* report, shows this trend from 1995 to 1997 for selected countries.

The E-mail surveys conducted through UNICEF and PAHO country offices for this review requested information on the percentage of vaccines financed by both governments and donors, including both traditional EPI vaccines and newer vaccines. (The financing of new vaccines is discussed separately in more detail in Section 2.2.1.2) The survey results are shown in *Table 12*. A list of all countries responding to the survey by the government's share of vaccine costs is shown in *Annex Table A1*. These results show that the majority of countries whose UNICEF or PAHO offices responded to the survey fall at the two extremes: those that finance all or most of their vaccine supply, and those that are almost entirely dependent on donors for their vaccine needs.¹⁵ As shown in *Table 12*, 28 out of 78 countries responding to our survey (36 percent) reported being totally self-reliant for their routine vaccine supply, 20 countries (26 percent) reported being completely dependent on donors, and 29 countries (37 percent) finance a portion of their vaccine supply. As shown in the table, most countries reporting from the Latin America and Caribbean region—18 countries or 72 percent of the survey sample—finance 100 percent of their routine vaccine supply. To facilitate this, many take advantage of the PAHO Revolving Fund. A number of middle-income countries in the Middle East and North Africa (e.g., Egypt), and several large, middle-income countries in Asia (including China, Indonesia, the Philippines, Pakistan, and Sri Lanka) also ensure 100 percent financing of their routine vaccine needs. Several other countries responding to the survey are nearly self-financing, such as India (99.6 percent), Peru and Nicaragua (98-99.5 percent), and Nigeria (83.5 percent).

¹⁴It must be noted that the CVI counts World Bank loans and budgetary support from the European Union in the Sahelian countries as government contributions, since these funds go into the governments' general revenues.

¹⁵ It should again be noted that the data in the E-mail surveys and from UNICEF tables are from government budgets and do not indicate actual expenditures, which may differ substantially from planned expenditures.

Table 11: Percent of Routine Vaccines Financed by Government, Selected Countries, 1995-1997*

Country	Band	GNP/Capita	1995	1996	1997
Uganda**	A	\$180	0%	35%	49%
Nepal	A	\$ 190	27%	40%	50%
Mali***	A	\$ 270	0%	65%	100%
Ghana	A	\$ 430	24%	50%	4%†
Benin	A	\$ 430	0%	15%	30%
Zimbabwe	B	\$ 520	80%	90%	100%
Ivory Coast	B	\$ 630	80%	100%	100%
Philippines**	C	\$ 850	70%	88%	100%
Botswana	C	\$2,790	89%	100%	N/A

* Routine vaccines refers to the six traditional EPI antigens used for routine (non-campaign) use. Countries are listed in ascending order by GNP/capita.

** Countries participating in the VII

*** Government financing includes EU budgetary support funds.

†The apparent decrease in Ghana's share of vaccine funding in 1997 is due to the fact that, with the institution of new health reforms in Ghana, a general pool for donor funds was created, and one donor, the Department for International Development (DFID), preferred to pay for vaccines instead of contributing to the general pool. In turn, government funds originally allocated for vaccines were used for other health sector needs. Thus, this apparent decrease in government funding is due more to donor preferences than to an actual decrease in funding commitment. The plan is for DFID to fund vaccines for three years, and thereafter, the government will work out another arrangement, presumably contributing a portion of the vaccine costs, as it has in the past.

N/A = not available

Sources: UNICEF, 1997a and 1998, Polsky (personal communication)

The majority of countries that do not finance any of their vaccine needs are in Sub-Saharan Africa. In the E-mail survey, 70 percent of countries in this category (14 of the 20) are in Africa. Of the 26 African countries responding to the survey, 14 (54 percent) reported no government contribution towards the financing of vaccines, while only three countries—Botswana, Ivory Coast, and South Africa—reported that the government financed 100 percent of their vaccine supply.¹⁶ Other countries in the survey that are totally dependent on donors for vaccines are the low-income, small Asian countries of Lao PDR, Bhutan, and North Korea, and poorer Eastern European countries (e.g., Albania, Bosnia) and Central Asian countries (e.g., Tajikistan). These findings are similar to those cited by Hausdorff, who reported that, in 1996 36 African countries and five Asian countries were completely dependent on donors for their routine vaccine needs (Hausdorff, 1996).¹⁷

¹⁶ The PHR E-mail survey counted countries participating in the EU Initiative as totally donor-dependent, since they receive their funding for vaccines from the EU as part of its structural adjustment and budgetary assistance.

¹⁷ It should be noted that some African countries whose UNICEF office did not respond to the survey, including Zimbabwe, have been more successful in financing their vaccine needs. In addition to financing 100 percent of the traditional EPI vaccines for routine use, this Band B country is also financing its measles vaccine supply for an elimination campaign and has allocated funding for the nation-wide reintroduction of Hepatitis B vaccine (in combination with DTP) in early 1999 (David Halliday, personal communication).

Table 12: Distribution of Countries Responding to the E-Mail Surveys by the Percentage of Vaccine Supply Financed by the Government (for latest year available)

Region		Percentage of Vaccine Supply Financed by the Government						
	Response Rate: number of countries (%)	0%	1-25%	26-50%	51-75%	76-99%	100%	No Response/ Information Not Available*
		No. of countries (%)	No. of countries (%)	No. of countries (%)	No. of countries (%)	No. of countries (%)	No. of countries (%)	No. of countries (%)
Asia/Pacific	10 (52.6)	3 (30.0)	2 (20.0)	0 (0.0)	1 (10.0)	1 (10.0)	2 (20.0)	1 (10.0)
Eastern Europe/NIS	11 (68.8)	3 (27.3)	2 (18.2)	2 (18.2)	2 (18.2)	0 (0.0)	2 (18.2)	0 (0.0)
Latin America/Caribbean	25 (69.4)	0 (0.0)	0 (0.0)	1 (4.0)	1 (4.0)	5 (20.0)	18 (72.0)	0 (0.0)
Middle East/North Africa	6 (46.2)	0 (0.0)	0 (0.0)	1 (16.7)	0 (0.0)	2 (33.3)	3 (50.0)	0 (0.0)
Sub-Saharan Africa	26 (55.3)	14 (53.8)	4 (15.4)	4 (15.4)	0 (0.0)	1 (3.8)	3 (11.5)	0 (0.0)
All regions	78 (59.5)	20 (25.6)	8 (10.3)	8 (10.3)	4 (5.1)	9 (11.5)	28 (35.9)	1 (1.3)

* From countries responding to the survey.

Note: These percentages are for routine immunization services and do not include special campaigns (e.g., Measles in Philippines and polio NIDs in Ivory Coast and India, which are heavily donor funded). For Burkina Faso, Cape Verde, Niger and Senegal, EU funds are counted as donor contributions.

Source: UNICEF and PAHO E-mail surveys

Another indication of countries' commitment to financing their vaccine and immunization program needs is whether or not they have a specific line item in the government budget for vaccines or for their immunization program. UNICEF data from 1997 indicate that 81 percent (66 out of 81) of countries responding to its survey for the *State of the World's Children* report have a specific line item for vaccines, including 71 percent of African countries, 96 percent of LAC countries, and 61 percent of countries in Asia and the Pacific (UNICEF, 1997a). The results are similar in our E-mail survey, which asked if countries have a budgetary line item for their immunization program (not just vaccines). As shown in *Tables 13* and *14*, 59 out of 78 countries overall or 76 percent responded yes, including 62 percent of countries in Sub-Saharan Africa. Interestingly, even some countries that depend entirely or heavily on donors for their vaccine supply indicated that they have a budgetary line item for immunization. These include Burundi, Lao PDR, and Bhutan, all of which are totally donor-dependent for their vaccines, as well as Cambodia, which finances approximately 20 percent of its vaccine supply, and Madagascar, which contributes around 7 percent. It is likely that, in some of these cases, as in Bhutan, the immunization line item covers such recurrent costs as vaccine delivery and logistics, and travel allowances for staff, but not necessarily vaccines.

As one would expect, the picture concerning government financing for vaccines is quite different for disease eradication campaigns, which are heavily donor-funded, even in countries that are otherwise self-reliant for their vaccine needs. Data from the E-mail survey indicate, for example, that the Indian government pays for nearly all (99.96 percent) of its vaccines for routine EPI, but only 23 percent of the vaccines used during its polio eradication campaigns. In terms of total EPI costs, the government pays an estimated 85 to 90 percent of recurrent costs for routine immunization, but only 46 percent of the total costs of the polio campaigns. Similarly, Indonesia pays for all of its routine EPI vaccines (around \$21 million worth in 1998), but received \$1.7 to \$2.4 million per year between 1995 and 1997 of oral polio vaccine (OPV) from international donors for its National Immunization Days (NIDs). Donors are also

Table 13: Number and Proportion of Countries Responding to the E-mail Surveys that have a Specific Budgetary Line Item for Immunization, by Region

Region/Country	Response Rate (%)	Has Line Item		No Line Item		No response*		Total	
		No.	%	No.	%	No.	%	No.	%
Asia/Pacific	52.6	8	80.0	1	10.0	1	10.0	10	100.0
Eastern Europe/NIS	68.8	7	63.6	4	36.4	0	0.0	11	100.0
Latin America/Caribbean	69.4	24	96.2	1	3.8	0	0.0	25	100.0
Middle East/North Africa	46.2	4	66.7	1	16.7	1	16.7	6	100.0
Sub-Saharan Africa	55.3	16	61.5	8	30.8	2	7.7	26	100.0
Total	59.5	59	75.6	15	19.2	4	5.1	78	100.0
* From countries responding to the survey Source: UNICEF and PAHO E-mail surveys									

Table 14: Countries Responding to the UNICEF and PAHO E-Mail Surveys that Have Specific Budgetary Line item for Immunization, by Region

Region	Countries
Asia/Pacific	Bhutan, Cambodia, Indonesia, Lao PDR, Mongolia, Pacific Islands, Philippines, Sri Lanka
Eastern Europe/NIS	Armenia, Georgia, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan, Yugoslavia
Latin America/Caribbean	Antigua and Barbuda, Argentina, Barbados, Brazil, British Virgins, Colombia, Costa Rica, Cuba, Dominica, El Salvador, Grenada, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, St. Lucia, St. Vincent and Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos (all countries reporting except St. Kitts and Nevis)
Middle East/North Africa	Algeria, Lebanon, Tunisia, Yemen
Sub-Saharan Africa	Benin, Botswana, Burkina Faso, Burundi, Cameroon, Guinea, Ivory Coast, Lesotho, Madagascar, Niger, Nigeria, Senegal, South Africa (provincial level), Sudan, Togo, Zambia

entirely financing the vaccines for the measles elimination campaign in the Philippines, which is otherwise self-reliant in financing vaccines. The cost of the measles vaccine for this campaign for one year amounted to more than \$4.6 million, compared to \$5.6 million for routine EPI vaccines, increasing the total vaccine costs by 83 percent.¹⁸

2.2.1.2 Financing of Additional Vaccines

Given the relatively high costs of the many of the newer vaccines, and the resulting difficulties that many countries are facing in financing their introduction into national immunization programs, this section will discuss the financing of additional vaccines separately. It will focus on three additional vaccines: (1) Hepatitis B, which was recommended by the World Health Assembly in 1992 for inclusion in all countries' national immunization programs, (2) yellow fever, which WHO recommended in 1989 be included in the immunization programs of 33 Sub-Saharan countries and several South American countries, and (3) Haemophilus influenzae type b, which WHO recommended in 1997 be incorporated in national immunization programs in countries with a known significant Hib disease burden.

Table 15 shows the number of countries in the E-mail survey that include additional vaccines in their immunization programs. (The list of countries by vaccine is shown in *Annex Table A2*.) It should be noted that the survey responses do not always indicate if the introduction is nationwide or more limited (e.g., for high-risk groups only or in certain regions).

Of the three vaccines, Hepatitis B has been introduced into national immunization programs to a much greater extent than the other two vaccines. The introduction of the vaccine in country programs began slowly after the vaccine was developed in the early 1980s, due to its high cost (\$30/dose or more) and the reluctance of donors to finance it. However, as the price has decreased dramatically in recent years to less than \$.50/dose for the plasma-derived vaccine, more and more countries have incorporated Hepatitis B into their NIP, either in selected areas or on a nationwide basis. According to WHO, 90 countries now

¹⁸ The high measles vaccine costs are due to the fact that all children 9 months to 14 years old are targeted in measles campaigns (versus children under five for polio campaigns), and thus many more doses of the vaccine are required. The measles vaccine is also somewhat more expensive than the other traditional EPI vaccines.

Table 15. Number of Countries Responding to the E-mail Surveys that have Introduced New Vaccines into their National Immunization Program, by Vaccine and Region

Region	No. Countries Responding (response rate)	Hepatitis B		Hib		Yellow Fever*	
		No.	%	No.	%	No.	%
Asia/Pacific	10 (52.6%)	5	50.0	0	0.0	N/A	N/A
Eastern Europe/NIS	11(68.8%)	5	45.4	0	0.0	N/A	N/A
Latin America/Caribbean	25(69.4%)	17	68.0	4	16.0	4*	16.0
Middle East/North Africa	6 (46.2%)	4	66.7	0	0.0	N/A	N/A
Sub-Saharan Africa	26 (55.3%)	4	15.4	0	0.0	5	19.2
Total	78 (59.5%)	35	44.9	4	5.1	N/A	N/A
*Yellow fever vaccine is recommended only in 33 Sub-Saharan African countries and several countries in LAC region. N/A = not applicable							

include Hepatitis B in their programs, and the vaccine is available through the private sector in nearly all countries. As seen in *Table 15*, 35 of the 78 countries responding to the survey (45 percent) have incorporated the vaccine into their national immunization programs. However, the introduction of Hepatitis B has been driven more by economics than by need. Many of the countries with the greatest need for the vaccine have not included it into their national program, due presumably to its relatively high cost. In Sub-Saharan Africa, for instance, where sero-prevalence rates are as high as 10 to 15 percent in children, only five countries—all relatively well-off—had included Hepatitis B in their immunization programs as of December 1996 (Botswana, The Gambia, South Africa, Swaziland, and the Seychelles) (Steinglass, 1996). Since then a few others, including Nigeria, have introduced the vaccine.

A number of developing countries have begun to manufacture their own Hepatitis B vaccine, mainly plasma-derived, through public sector institutions. These include China, which has seven facilities that produce the plasma-derived vaccine and two that produce the DNA recombinant vaccine; India (which has several producers); Indonesia; and Cuba. Brazil and Vietnam have also recently begun their own manufacture of the vaccine. In most cases, the countries are not able to produce enough vaccine for their own needs and must continue to buy from foreign suppliers. One exception is Cuba, which manufactures enough Hepatitis B vaccine to meet its own needs and to sell to several countries in the region (Mark Kane, personal communication).

Although yellow fever is considerably less expensive than Hepatitis B (UNICEF currently purchases it for \$.17/dose), its introduction into national immunization programs has also been slow. Only 16, or half, of the 33 African countries where it has been recommended have included it in their national immunization programs (WHO/UNICEF, 1996). Several at-risk countries in Latin America and the Caribbean have, however, incorporated the vaccine into their national programs, including the countries of Brazil, Colombia, Peru, and Suriname that responded to the E-mail survey. In several African countries where yellow fever vaccine has been introduced, coverage has declined, in some cases, as a result of withdrawal of donor funding. The 1996 *State of the World's Vaccines and Immunization* reports that vaccine coverage overall in the 33 target countries in Africa declined from only 11 percent in 1992 to 9 percent in 1994, and in some countries

the decline was more dramatic (down from 23 percent in 1992 to 0.2 percent in 1993 in Mali and from 37 percent in 1992 to 14 percent in 1993 in Togo) (WHO/UNICEF, 1996). It is interesting to note, that although EU Initiative funding does not cover yellow fever, three of the four countries responding to the PHR survey that participate in the program (Burkina Faso, Senegal, and Niger) have incorporated the vaccine into their national immunization programs.

Hib, the newest and most expensive of these additional vaccines, has been incorporated into the national programs in six countries in Latin America and the Caribbean (Chile, Uruguay, Argentina, Colombia, Costa Rica, and Peru). The vaccine is now available through the PAHO Revolving Fund at a price per dose of \$3.35 (in a pre-filled syringe). Other countries have also introduced Hib into their program, including Fiji.

Concerning the use of these vaccines in the private health sector, little information exists concerning the availability, usage, and prices of these vaccines through private sector clinics and pharmacies. Hepatitis B, as mentioned above, is reportedly available in the private sector in most countries. Hib and yellow fever are also available through the private sector in a number of countries. Although precise price information is often lacking, the price of these vaccines through private sector channels is reported to be considerably higher, as one would expect, than in the public sector. In Romania, for instance, private pharmacies were charging \$15 to \$30 per dose for Hepatitis B vaccine in 1995, compared to an estimated cost (with freight, etc.) of \$3.15/dose for the vaccine used at government dispensaries (R. Fielden, personal communication).

Although the E-mail surveys did not ask specifically about the financing of these additional vaccines, we were able to obtain some information on this from respondents' comments and from the literature. Given the relatively high costs of these vaccines compared to the traditional six EPI antigens and donor reluctance to pay for them, countries are often using different strategies for financing them than for the traditional EPI vaccines. Four patterns of financing the newer vaccines can be discerned:

1. *Governments fully finance the additional vaccines, as well as the traditional EPI vaccines.* Most of the countries that fall into this category are middle-income countries such as Brazil, Colombia, the Philippines, and Cuba, which have all introduced Hepatitis B. However, there are some exceptions, such as Honduras and Zimbabwe, which are relatively low-income countries that have also introduced Hepatitis B. Government financing of additional vaccines has become more possible as the prices, especially of Hepatitis B, have fallen dramatically, due to a number of factors. These include the fact that the vaccine is not a "mature" product and thus off-patent, which has driven down the production costs; the fact that the inter-agency International Task Force on Hepatitis B Immunization has had success in convincing suppliers that by lowering their costs, they would have access to a potentially huge lucrative market; and the assistance by donor and cooperative agencies in negotiating reasonable prices with manufacturers on behalf of individual countries. This was the case in the Philippines, where the government, with technical assistance from UNICEF and the REACH Project, put out a competitive international tender and bid in 1990/91 and was able to negotiate a price per dose for plasma-derived Hepatitis B of \$0.55, the lowest price that had ever been quoted for this vaccine up to that time. Some countries procure these vaccines through the VII and the PAHO Revolving Fund and have used these mechanisms to obtain good prices (e.g., Morocco and Brazil), while others buy them directly from manufacturers.¹⁹
2. *Donors finance the additional vaccines.* The CVI Consultative Group has developed a set of criteria to identify priority countries for receiving external financial support for the newer vaccines. These criteria include: financial need (countries in Band A, and Band B for a limited period), disease

¹⁹ The UNICEF price for Morocco in 1998 for DNA recombinant Hepatitis B vaccine, with shipping and other fees, was \$0.76 per dose in 1998, while the PAHO Revolving Fund price was \$0.82 per dose, which does not include the cost of freight, insurance and handling.

burden, a strong national immunization program, the ability of the government to meet financing targets for routine vaccines, and the MOH's decision to include the vaccines (CVI, 1995). Despite the establishment of these criteria, however, donors have been reluctant to finance the newer vaccines, even in countries that meet the criteria. This is occurring in some countries, however, including the Pacific Island region, where donors (Australia and New Zealand) are currently funding all of their Hepatitis B vaccine supply, while the governments are financing all of their traditional EPI vaccines. In other countries, donors are paying for additional vaccines, as well as the traditional EPI antigens. This is the case in Bhutan, where the government of Japan pays for all of its regular EPI vaccines, while another donor, the Danish International Development Agency (DANIDA), is financing Hepatitis B vaccine for five years (E-mail survey results). Another example is Cameroon, which is receiving donor funding for Hepatitis B, despite the fact that it finances only about one-third of its traditional EPI vaccine supply (WHO/AFRO, 1998). It has also become common practice for manufacturers to donate a year or two's supply (or partial supply) of Hepatitis B and now Hib vaccine to countries in order to create a demand for their products, and thereafter charge a high price for the vaccine. For example, our survey found that Smithkline Beecham is donating 80,000 doses of Hib to Costa Rica in 1998 to vaccinate all newborns.

3. *Governments finance the additional vaccines, while donors help fund the traditional EPI vaccines.* Although information on this is lacking, this is reportedly occurring in a number of countries, including Senegal, which receives EU funding for the traditional vaccines but is apparently buying Hepatitis B and yellow fever with government financing (Miloud Kaddar, personal communication). This is also reportedly true in Kyrgyzstan—which bought mumps vaccine with government funds, while receiving 100 percent financing from donors for traditional EPI vaccines—among other countries (Murray Trostle, personal communication).
4. *Governments charge user fees only for the additional vaccines.* It has been reported that, in China, patients must pay to receive the Hepatitis B vaccine, while all other vaccines are free of charge (WHO/UNICEF, 1996; Hausdorff, 1996). It is not known to what extent this is occurring in other countries. This strategy for financing additional vaccines may have potential in other countries besides China. In Thailand, a recent immunization financing survey indicated a strong willingness of urban dwellers to pay for Hepatitis B, even at a relatively high cost; 48 percent of respondents expressed willingness to purchase the vaccine at the current market price of around \$60 per course and 87 percent were willing to pay one-half of that amount (Coopers & Lybrand et al., 1997). Other anecdotal evidence suggests that Hepatitis B and other new vaccines are perceived as being of especially high value in developing countries (Hausdorff, 1996). However, this strategy would likely create large discrepancies in coverage between urban and rural, or between wealthy and poorer areas, as occurred in China, where coverage for Hepatitis B was reportedly high in the urban areas (up to 90 percent), but considerably lower in the rural areas (15 to 20 percent) (WHO/UNICEF, 1996).²⁰ Means testing or targeting strategies, such as different fees schedules between the urban and rural areas and cross-subsidization of urban fees to help finance the costs in the rural areas, would have to be built into this approach, in order to minimize such inequities in coverage.

More information is needed on how the introduction of additional vaccines into national immunization programs is affecting the overall financing of these programs. For instance, are other program components (e.g., cold chain equipment and maintenance) or other health activities or inputs being cut to help pay for the additional vaccines? If so, what impact has this had on immunization program performance overall and/or on other health activities?

²⁰ Although, reportedly, the prevalence of the disease is much higher in urban than rural areas in China (R. Fielden, personal communication).

2.2.1.3 Financing of Routine Immunization Programs (Total Costs)

In addition to the financing of vaccines, the reviewers also looked at the share of total expenditures for routine immunization programs paid for by governments. Recurrent costs can include, in addition to vaccines, the cost of personnel; injection supplies, such as syringes and needles; vaccine delivery and logistics; cold chain maintenance; sterilization equipment; supervision and evaluation; disease surveillance and investigation; outreach activities; training; and social mobilization. Capital costs can include cold chain equipment, such as refrigerators, vehicles for vaccine delivery, and the construction of vaccine storage facilities.

In general, it is much more difficult to obtain data on total immunization program costs and how they are financed than it is to obtain data on the financing of vaccines. The team evaluating the Universal Child Immunization initiative was not able to determine actual immunization program expenditures from information given by either host governments or donors in any of the six countries where they conducted case studies (Taylor, Baer and Pyle, 1996). This was due to incomplete or conflicting data, problems in defining types of costs and in allocating costs within integrated programs, and other difficulties. In the E-mail survey through UNICEF, which requested only budget information on total non-personnel recurrent costs, as opposed to actual expenditures, 49 percent of countries responding either said that such information was not available or the UNICEF country officers were not able to readily obtain it from their host governments.²¹ This was especially true in the Middle East/North Africa region and Eastern Europe/NIS region, where more than 80 percent of respondents could not provide this information.

From what data that do exist on total recurrent immunization program costs from the LAC region, it appears that, at least in that region, governments are increasing their share of the financing of these costs, as they are with vaccines. *Table 16* presents data on the share of government financing of recurrent NIP costs over the past three years for the eight target countries of the USAID-funded measles elimination project implemented by PAHO. Recurrent costs in this instance include only vaccines, syringes, and cold chain maintenance.

As these data show, five of the nine countries have increased their share of EPI recurrent costs since 1995. In the case of Bolivia and Guatemala, however, the government's share of these costs actually decreased significantly during this period.

Table 16: Proportion of Recurrent NIP Costs Financed by National Resources, USAID Target Countries, Measles Elimination Project

²¹ Personnel cost estimates for immunization were not requested in the survey, given the difficulty involved in estimating these costs, especially in allocating health worker time for immunization services.

Country	1995	1996	1997
Bolivia	82%	64%	50%
Ecuador	69%	81%	77%
Peru	97%	99%	100%
El Salvador	100%	100%	100%
Guatemala	100%	92%	79%
Honduras	78%	82%	96%
Nicaragua	67%	76%	88%
Haiti	19%	22%	25%
Source: PAHO, 1997g			

In the E-mail survey carried out through UNICEF, respondents were asked to provide the dollar amount or percentage of the total recurrent immunization program budget (including vaccines, but excluding salaries) that governments and donors were contributing. The results are shown in *Table 17*. (A list of all countries responding to the survey by the government's share of total recurrent costs is shown in *Annex Table A3*.) No breakdown of costs by program component was requested in the UNICEF survey. Consequently, it is somewhat difficult to interpret the data received from UNICEF respondents, as it is not clear how they defined total recurrent costs (in some cases, they may have included salaries, although they were instructed not to do so). Also, as mentioned above, many of the respondents (33 or 48.5 percent) were not able to readily obtain information on total immunization program recurrent costs. A further difficulty stems from the fact that, increasingly, immunization program activities, such as supervision, logistics management, transport, and even training, are integrated into other primary health care activities, making it difficult to estimate the actual immunization program costs. In addition, some important recurrent costs, such as fuel and supervision costs, that are contributed by national governments, are often not tracked, which can result in underestimating the government's contribution. Also, since the survey was completed by donor agency staff, they may not have been able to obtain accurate or complete information on government funding, which could lead to them overestimating the role of donor contributions, since this information is often more readily available.

Despite these reservations with the data, *Table 17* and *Annex Table A3* seem to indicate that eight countries that responded to the survey (11.8 percent of the sample) still depend on donors for all vaccine and immunization program costs (e.g., cold chain, vaccine delivery and logistics, training), excluding salaries. These countries are: the Lao PDR, Burundi, Equatorial Guinea, Ethiopia, Liberia, Mozambique, and Rwanda. Some countries that receive all or nearly all of their vaccines from donors, however, do finance a portion of their total recurrent program costs—in the case of Sudan and Burkina Faso, this contribution is significant (32 percent and 46 percent, respectively), while it is less so (7-10 percent) in the Comoros and Bhutan.

Table 17: Distribution of Countries Responding to the UNICEF E-Mail Survey by the Share of Government Financing for Total Non-Personnel Recurrent Immunization Program Costs* (for the latest year available)

Region	Response Rate: number of countries (%)	Percentage of Total Non-Personnel Recurrent Immunization Program Costs Financed by the Government (for the latest year available)*						
		0 %	1-25%	26-50%	51-75%	76-99%	100%	No Response/ Information Not Available**
		No. of countries (%)	No. of countries (%)	No. of countries (%)	No. of countries (%)	No. of countries (%)	No. of countries (%)	No. of countries (%)
Asia/Pacific	10 (52.6)	1 (10.0)	2 (20.0)	0 (0.0)	0 (0.0)	2 (20.0)	0 (0.0)	5 (50.0)
Eastern Europe/NIS	11 (68.8)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)	9 (81.8)
Latin America/Caribbean***	15 (41.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (6.7)	9 (60.0)	2 (13.3)	3 (20.0)
Middle East/North Africa	6 (46.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (16.7)	0 (0.0)	5 (83.3)
Sub-Saharan Africa	26 (55.3)	7 (26.9)	3 (11.5)	3 (11.5)	0 (0.0)	0 (0.0)	2 (7.7)	11 (42.3)
All regions	68 (51.9)	8 (11.8)	6 (8.8)	3 (4.4)	1 (1.5)	13 (19.1)	4 (5.9)	33 (48.5)

* Total non-personnel recurrent immunization program costs include the costs of vaccines, cold chain equipment, supplies, social mobilization and outreach costs.

** Of countries responding to the survey

*** Does not include the 10 countries that responded to the PAHO survey (see *Table 16*).

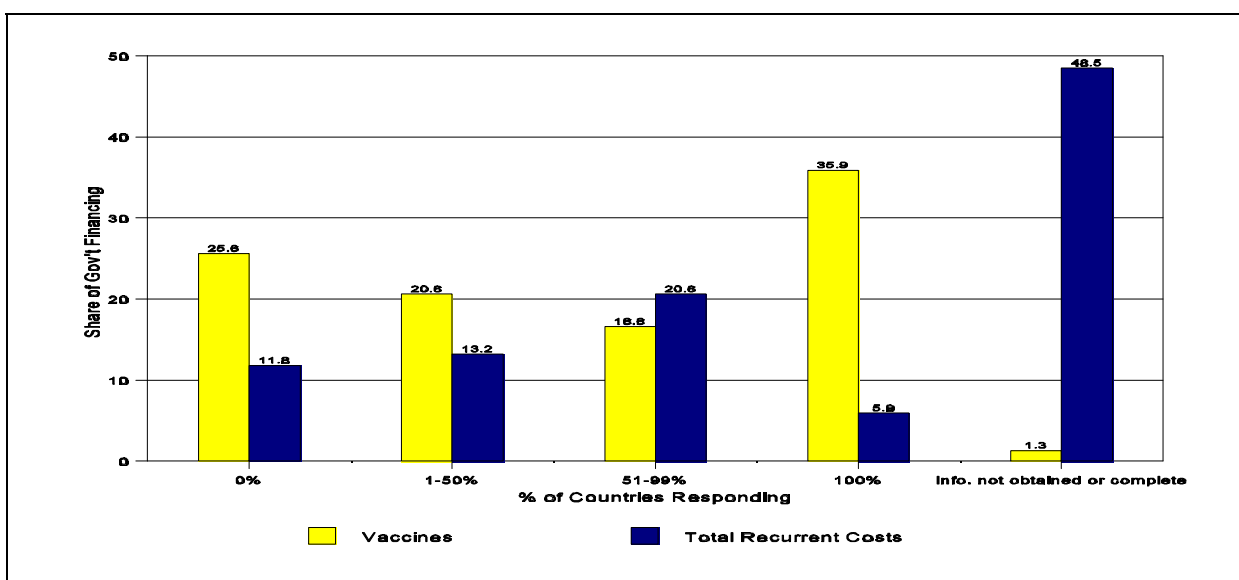
Source: UNICEF E-mail survey

The survey findings also show that most countries are receiving some donor support for routine immunization program costs, even countries that are financing all of their vaccine needs. Only four countries (5.9 percent of the sample) for which recurrent immunization program cost information was available reported paying for all of their vaccine and other routine program costs (Ivory Coast, South Africa, Antigua, and Barbados). However, a number of other countries that pay entirely for their vaccine needs, including India, Argentina, and Tunisia, are financing nearly all of their recurrent program costs (90 percent to 98 percent), receiving only relatively small amounts from donors to support their programs.

The differences between governments' share of vaccine financing and their share of total recurrent immunization program costs are clearly shown in *Figure 2*, which shows the distribution of countries by the government's share of both vaccine and total recurrent program costs for the 68 UNICEF survey respondents. While nearly one-third of the sample (22 countries) claims to finance of all their vaccine supply, less than one-fifth of these (four countries) also pay for all of their recurrent program costs. On the other hand, there are fewer countries (eight, or 11.8 percent of the sample) that are totally dependent on donors for all non-personnel recurrent costs than there are countries totally dependent for vaccines (20 countries, or 26 percent). The large proportion of the sample that did not provide sufficient data on total recurrent program costs (48.5 percent) again points to the difficulty in tracking these costs (versus vaccine costs), the fact that UNICEF officers may have had problems obtaining this information from governments, as well as perhaps to the emphasis that has been placed in recent years on the financing of vaccines over the financing of immunization programs in their entirety.

Budgetary data from the PAHO survey, which includes both capital and non-personnel recurrent costs, show similar patterns, as seen in *Table 18*. Although nearly all of the 10 countries responding to the PAHO survey pay for all of their vaccine needs, all of them continue to receive at least some donor funds for capital or recurrent program expenditures. In the case of Brazil and Colombia, these donor contributions are negligible, accounting for less than one percent of the total NIP budget, and are mainly for disease surveillance activities. In other cases, however, such as Panama, Nicaragua, and Honduras, which also finance all or nearly all of their vaccine supply, donors are still providing substantial financial assistance for other immunization program components. The government's share of total recurrent and capital immunization costs (including vaccines) is only around 61 percent in Panama, 74 percent in Nicaragua, and 84 percent in Honduras.

Figure 2: Distribution of Countries by Government Share of Financing of Vaccines and Total Non-



Personnel Recurrent Immunization Program Costs, UNICEF E-mail Survey Respondents

Table 18: PAHO Survey Respondents: Government Contribution to Routine (Non-Personnel) Recurrent and Capital Immunization Program Costs by Component

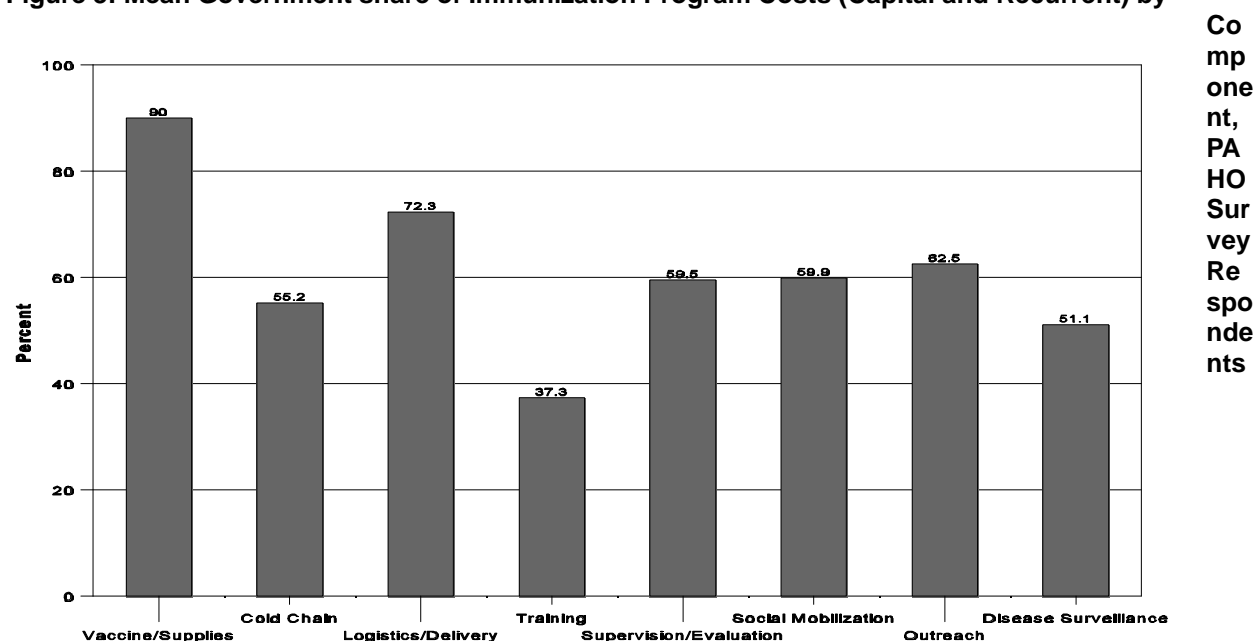
Country	Vaccines/ Supplies	Cold Chain	Vaccine Logistics/ Delivery	Training	Supervision/ Evaluation	Social Mobilization	Outreach	Disease Surveillance/ Investigation	Total
Bolivia	63.8 %	10.3%	0.0 %	37.0 %	3.4 %	78.9 %	72.3 %	5.9 %	57.0 %
Brazil	100.0	100.0	100.0	0.0	—	100.0	100.0	0.0	99.4 %
Colombia	100.0	100.0	100.0	54.6	100.0	100.0	100.0	94.8	99.8 %
El Salvador	100.0	Data not complete							
Honduras	100.0	32.7	66.2	76.0	75.1	27.5	—	52.7	84.0 %
Nicaragua	98.0	45.6	43.9	2.8	20.8	9.6	30.4*	8.7	73.7 %**
Panama	100.0	0.0	100.0	0.0	50.0	—	0.0	—	61.1 %
Peru	99.5	81.7	96.0	88.6	67.5	67.1	—	95.5	95.7 %
Suriname	100.0	Data not complete							
St. Kitts/ Nevis	39.1	71.4	—	39.4	100.0	36.0	72.2	100.0	46.2 %
Mean	90.0 %	55.2%	72.3 %	37.3 %	59.5 %	59.9 %	62.5 %	51.1 %	77.2 %

*Includes outreach activities for NIDs.

**Includes operation costs not included in these cost categories.

The PAHO survey data shown in *Table 18* and *Figure 3* also indicate which program components donors vs. governments are paying for in the LAC region. While the 10 countries are paying an average of 90 percent of their vaccine and vaccine supply costs, they pay on average only 37 percent of their training costs and less than 60 percent of the costs of cold chain equipment, disease surveillance, supervision, and social mobilization. In Panama, for instance, which finances all of its vaccine supply, donors are funding 100 percent of the cold chain, training, and outreach costs, according to the PAHO respondent. Donor contributions for cold chain equipment, which can include the construction of central vaccine storage facilities (“*banco nacional de biológicos*”), vehicles, and refrigerators, can constitute a significant portion of the total immunization program budget—36 percent in the case of Panama. In Nicaragua in 1998, donors are providing \$328,000 for cold chain expenditures (54 percent of the total cold chain budget), as well as additional funding to build a central storage facility. Even in Brazil, a band D country which pays for 99.4 percent of total immunization program costs, in 1997 donors contributed to immunization-related training and disease surveillance activities, although these costs could be mainly related to polio eradication activities, to which the international donor community was always expected to contribute heavily.

Figure 3: Mean Government share of Immunization Program Costs (Capital and Recurrent) by



Although the data are limited and incomplete, and are from budgets as opposed to actual expenditures, 1998 budgets prepared by WHO/AFRO for a number of African countries also show that donors continue to contribute substantially to other essential components of immunization programs, in addition to vaccines (WHO/AFRO, 1998). Besides financing most of the vaccine requirements for Tanzania and Angola, for instance, donors were expected to pay for 100 percent of the cold chain and injection/sterilization equipment to be purchased this year for routine immunization services in Tanzania and 96.7 percent of these costs in Angola. In both countries, in fact, the planned contribution by donors in 1998 came to around 83 percent of the total recurrent and capital costs required for routine immunizations, including all or nearly all of the training and transport costs. Angola is committed to paying for 68 percent of the planned expenditures for social mobilization, however.

2.2.1.4 Summary of Findings and Implications for Sustainability of National Immunization Programs

In summary, the above findings indicate that more and more governments—even in relatively poor countries—are financing all or a portion of their vaccine needs, including new vaccines. Thirty-six percent of the overall E-mail survey sample, and 72 percent of the sample of countries in the LAC region reported self-financing all of their vaccine needs. There are still a number of poor countries, mainly in Africa, that receive all or most of their vaccines from donors, however, and several of the poorest countries, or those devastated by war and civil disorder, depend on donors to finance nearly all non-personnel recurrent and capital costs of their program.

This review also highlights the difficulty in obtaining accurate and complete information on costs and financing of recurrent program expenses—as opposed to the financing of vaccines—especially through a rapid E-mail survey. Nonetheless, the data we obtained do seem to indicate that most countries, including many that finance all of their vaccine supply, continue to receive at least some financial support for their immunization programs, both for recurrent expenditures, such as disease surveillance, training and supervision/evaluation activities, as well as for capital expenditures such as cold chain equipment—although at least some of these costs may be associated with the worldwide polio eradication program. The proportion of countries surveyed that reported self-financing all non-personnel immunization program costs was only 6 percent versus 36 percent that reported self-financing their vaccines. This suggests that governments may be inadequately funding critical activities supporting immunization and primary health care programs, such as training and supervision, to pay for their vaccine supplies. The continued funding by donors for these support activities, as well as for cold chain equipment and other capital expenditures required to maintain a high-quality immunization program, suggests that the international health community should broaden its focus from the sustainability of vaccine financing alone to the sustainability of immunization programs in their entirety.

2.2.2 Cost Recovery for Immunization Services

Cost recovery has become increasingly common in the last two decades as a means of raising funds for government-run health services, especially in Africa and Asia. The types of cost recovery mechanisms that are being implemented in different countries vary from direct payment mechanisms, such as user fees, to such indirect payment methods as prepayment schemes and other types of social insurance, cross-subsidization (e.g., of preventive care through charges for hospital or curative care), and national or community-based fundraising schemes. Cost recovery can also include in-kind contributions, such as labor or goods. This

section will discuss findings from the literature, previous research, and the E-mail surveys on the use of cost recovery specifically for immunization services.

2.2.2.1 Prevalence of Cost Recovery for Immunization Services and Types of Mechanisms Used

The REACH Project conducted a worldwide telex survey on cost recovery for immunization in 1991 (Percy, Brenzel and Waty, 1991). Cost recovery for the REACH survey was broadly defined to include voluntary and in-kind contributions, local fundraising activities, as well as mechanisms such as fees per shot or series, fees per immunization card, prepayment and other social insurance schemes, and cross-subsidization. The survey found that, of the 79 countries that responded, very few had a formal policy of cost recovery for immunization. Nonetheless, 54 percent reported some type of cost recovery effort for immunization in either the public or private sector. The prevalence of cost recovery for immunization services was found to be highest in Africa and Asia—where more than 60 percent of countries reported its use—and lowest in the Latin America/Caribbean region, where less than 30 percent of countries reported its practice.

The study also found distinct regional patterns concerning the types of cost recovery mechanisms and their use in the public or private sector. In Africa, fees for shots or immunization cards in public sector facilities were the most common cost recovery method, whereas in the Asia and Near East region, user fees were mainly limited to the private sector, and most public sector efforts involved voluntary cash, labor, or other in-kind contributions. In the LAC region, much of the little cost recovery for immunization that was reported consisted of voluntary contributions, especially labor for immunization campaigns, as well as fundraising efforts. In Mexico, for example, the national lottery made a donation in 1990 of posters to publicize their National Immunization Days, as well as other materials. Coverage of immunization through social insurance programs was reported in only a small number of countries, since most of these programs cover mainly curative and hospital care. This was true even in the LAC region where social security programs can play an important role in health care financing; only two countries—Panama and Costa Rica—reported that their social security systems financed or provided immunization services. However, the authors of the study believed that immunization coverage by social insurance was under-reported in the study, as were the use of fees in the private sector and voluntary contributions for NGOs.

The E-mail surveys conducted by PHR through UNICEF and PAHO requested information only about cash-based types of cost recovery mechanisms, such as user fees and prepayment or insurance schemes, as opposed to voluntary types of contributions and other fundraising activities. The survey also did not ask about the practice of patients having to buy their own syringes before coming to government health facilities, a form of cost sharing which is reportedly common in many countries. The following discussion focuses on cost recovery in the public sector, since it is assumed that for-profit private providers and NGOs charge for immunization and other preventive health services.

When asked about cost recovery for health services in general, 73 percent of the countries responding (57 out of 78) reported the use of cost recovery in the public sector, either nationwide or in some areas, as shown in *Table 19*. However, most cost recovery reported covers only hospital and curative care services, as opposed to preventive care services. While two-thirds of the countries overall reported the existence of cost recovery for hospital and curative care, only 27 percent (21 countries) reported the use of cost recovery for preventive care. Cost recovery for preventive health care was reported most frequently in the Eastern Europe/NIS region (five out of 11 of countries) and in Sub-Saharan Africa (12 countries or 46 percent),

where several countries are implementing the Bamako Initiative.²² This contrasts with the LAC region, where only one country—Costa Rica—out of 25 responding to the survey reported cost recovery for preventive care services.

²²The Bamako Initiative is an effort supported by UNICEF and WHO to improve access and availability of primary health care services through community-financing based on fees for health services and drugs, and community management of health services and community-generated funds.

Table 19: Number of Countries Implementing Cost Recovery in the Public Health Sector, by Type of Health Care

Region	Countries with Cost Recovery in Public Sector		Type of Care						Countries with No Cost Recovery in Public Sector or No Response*		Total	
			Curative		Hospital		Preventive					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Asia	6	40.0	4**	40.0	5**	50.0	2**	20.0	4	40.0	10	100.0
Eastern Europe/ NIS	6	54.5	6	54.5	5	45.4	5	45.4	5	54.5	11	100.0
Latin America/Caribbean	17	68.0	15	60.0	16	64.0	1	4.0	8	28.0	25	100.0
Middle East/North Africa	5	83.3	5	83.3	5	83.3	1	16.7	1	16.7	6	100.0
Sub-Saharan Africa	23	88.5	22	84.6	21	80.8	12	46.1	3	11.5	26	100.0
Total	57	73.1	52	66.7	52	66.7	21	26.9	21	26.9	78	100.0
* Among countries responding to the UNICEF and PAHO E-mail surveys.												
** Includes Cambodia, which reports cost recovery for all types of care in some areas on a pilot basis.												
Source: UNICEF and PAHO E-mail surveys.												

Regarding cost recovery specifically for immunization services, seven countries reported having a formal cost recovery policy for immunization services (see *Table 20*).²³ Five of these seven countries are African countries where cost recovery for immunizations is being implemented in the context of the Bamako Initiative. Another seven countries reported cost recovery taking place in the absence of a formal policy, and in four of these cases (Cambodia, Indonesia, Kenya, and Madagascar), only in certain parts of the country or on a pilot basis. In all, 14 countries surveyed (18 percent) reported the existence of cost recovery for immunization services in the public sector (or in the case of Lesotho, through the Christian Health Association of Lesotho [CHAL], which provides an estimated 50 percent of health services in the country). The use of cost recovery for immunizations is more common in Africa and Asia than in other regions. None of the 25 countries in the LAC region that responded to the survey reported its use in the public sector.

Although these figures seem considerably lower than the findings of the Percy study, where 54 percent of countries reported cost recovery in place for immunization services, they are actually quite similar if one eliminates the voluntary contributions, community fundraising activities, and the private sector use of cost recovery from the figures in the Percy study. Comparing the findings of the two surveys, one can conclude that, in fact, there has not been much increase in the existence of formal policies for cost recovery for immunization services in the seven years since the Percy study took place.

²³These countries do not include Yugoslavia and Croatia, which cover immunization services through their national medical insurance programs.

Table 20: Countries Implementing Cost Recovery for Immunization Services, UNICEF and PAHO Survey Respondents

Region	Countries with Formal Cost Recovery Policy for Immunization	Countries Implementing Cost Recovery for Immunization Without Formal Policy	No. and % of Countries with Cost Recovery for Immunization by Region (among survey respondents)	
			No.	%
Asia	Mongolia	Cambodia* Indonesia*	3	30.0
Eastern Europe/ NIS**			0	0.0
Latin America/Caribbean			0	0.0
Middle East/North Africa	Lebanon		1	16.7
Sub-Saharan Africa	Benin Comoros Guinea Ivory Coast Senegal	Burkina Faso Kenya* Lesotho*** Madagascar* Togo	10	38.5
Total			14	17.9
<p>* In some localities or regions only.</p> <p>** Croatia and Yugoslavia, which report covering immunization services through their national medical insurance programs, are not included in this table.</p> <p>***Through the Christian Health Association of Lesotho, a church-affiliated NGO that owns about 50 percent of all health facilities in the country.</p> <p>Source: UNICEF and PAHO E-mail surveys</p>				

Tables 21 and 22 show the cost recovery mechanisms that are being used for immunization services in the countries responding to the E-mail survey. As found in the Percy study, a number of countries are using more than one mechanism to recover costs for immunizations. Direct payment mechanisms—user fees per immunization card or per shot or series—was found in 12 countries, with fees per card being the most common method (in 10 countries), followed by fee per shot or services (in six countries). Of the 12 countries implementing direct user fees for immunization services, nine are in Sub-Saharan Africa. Cross-subsidization of immunization services from curative care fees was reported in eight countries. Only one country—Lesotho—reported cost recovery for immunization through a prepayment system set up by the NGO, CHAL, included in this discussion because it is a major provider of health services in the country. Through this system, all children coming to the CHAL clinics for the first time must pay to be weighed and to receive a health booklet before they are provided services, including immunizations. The entrance fee allows them to receive curative and preventive services free of charge.

It is likely that cross-subsidization through fees for drugs and curative care visits was under-reported in the survey, especially in countries implementing the Bamako Initiative.

Table 21: Types of Cost Recovery Mechanisms used for Immunization in Countries Responding to the UNICEF and PAHO E-mail Surveys, by Region

Region	Countries with Cost Recovery for Immunization		Type of Mechanism										No Cost Recovery or No Response**		Total	
			Fee per shot		Fee per Immunization Card		Cross-Subsidization		Social Insurance		Prepayment					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Asia/Pacific	3	30.0	1	10.0	1	10.0	1	10.0	0	0.0	0	0.0	7	70.0	10	100.0
Eastern Europe/NIS***	0	0.0	0	0.0	0	0.0	0	0.0	0***	0.0	0	0.0	11	100.0	11	100.0
Latin America/Caribbean	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	25	100.0	25	100.0
Middle East/North Africa	1	16.7	1	16.7	1	16.7	1	16.7	0	0.0	0	0.0	5	83.3	6	100.0
Sub-Saharan Africa	10	38.5	4	15.4	8	30.8	6	23.1	0	0.0	1	3.8	16	61.5	26	100.0
Total	14	17.9	6	7.7	10	12.8	8	10.3	0	0.0	1	1.3	64	82.1	78	100.0

* Several countries use more than one cost recovery mechanism for immunization services, and thus the totals across the bottom of the chart are greater than the total number of countries reporting cost recovery for immunization services (14 countries or 17.9%).

** Among countries responding to the survey.

***Does not include Yugoslavia and Croatia, which report covering immunization service costs through their national medical insurance programs.

Source: UNICEF and PAHO E-mail surveys

Table 22: Types of Cost Recovery Mechanisms used for Immunization and Estimated Cost Recovery Rates in Countries Responding to the E-mail Surveys

Country	Types of Cost Recovery Mechanisms for Immunization*	Estimated Rate of Cost Recovery (%)
Cambodia**	Cross-subsidization	Unknown
Indonesia**	Fee per shot (\$.05)	1.8
Mongolia	Immunization card	0.0
Lebanon***	Fee per shot, fee per card, cross-subsidization	60.0
Benin	Fee per card (\$.20), cross-subsidization	Unknown
Burkina Faso	Fee per card	<2.0
Comoros	Fee per card (\$.22), fee per shot (\$.22)	Unknown
Guinea	Fee per card (\$.25), cross-subsidization	Unknown
Ivory Coast	Fee per card (\$.16)	4.0
Kenya**	Cross-subsidization	Unknown
Lesotho†	Fee per card, fee per shot, cross-subsidization, prepayment	Unknown
Madagascar**	Fee per card (\$.05), cross-subsidization	<1.0
Senegal	Fee per shot (\$.13)	20.0 - 30.0
Togo	Fee per shot (\$.04), fee per card (\$.16), cross-subsidization	Unknown
<p>* Amount of the fee in US \$ is indicated in parentheses, if known.</p> <p>** Cost recovery for immunizations occurring in some areas only or on a pilot basis.</p> <p>*** An estimated 80 percent of immunizations in Lebanon are delivered through the private sector.</p> <p>† An estimated 50 percent of immunization services in Lesotho are delivered through the church-based network, Church Health Association of Lesotho.</p>		

In addition to such conventional mechanisms as user fees, some countries or local areas have developed innovative means of recovering costs for immunization services. In Hebei and Henan provinces of China, for example, a “EPI contract” system was set up in the 1980s (Zi, 1990; Jarrett, 1988). This is a prepayment scheme in which, upon the birth of a child, parents pay a fee that covers all EPI immunizations to the age of seven. The premiums are split between the county epidemic prevention station, the township hospital, and the village doctor, for whom the premiums can make up as much as one-third of his/her salary. A portion of the premiums are also used to pay for vaccination equipment and cold chain maintenance. In addition to the premiums, a further incentive for the county, hospital, and village doctors to fully immunize all children participating in the scheme is that all three must compensate any child who contracts a EPI target disease (with the exception of tuberculosis, given the relatively poor effectiveness of the BCG vaccine). This scheme reportedly led to substantial increases in immunization coverage rates in Hebei Province, and a large decrease in the incidence of the target diseases, although the program could have led to under-reporting of these diseases. A similar contract scheme has been tested in some parts of Vietnam (Percy, Brenzel and Waty, 1991). In other parts of China, village doctors are given a subsidy by the village or county government as an incentive to provide preventive health services, including immunization free of charge, and which is often based on performance (Jarrett, 1988). Other innovative cost recovery mechanisms described in the literature include: earmarked taxes on sugar to raise local funds for immunization services in one region of Sudan; selling surplus energy to communities generated from solar cold chain equipment as part of a pilot project in

Zaire; and donations from the national lottery in Mexico for immunization-related materials during immunization campaigns, as described above (Percy, Brenzel and Waty, 1991).

2.2.2.2 Rates of Cost Recovery and Use of Recovered Funds

The user fees for immunization reported in the E-mail survey ranged from rather nominal fees of \$.05 per shot or card to \$.22 per shot and \$.25 per card. As shown in *Table 22*, in five of the 12 countries in the E-mail survey reporting user fees for immunization, the amount of costs recovered was estimated at less than 5 percent; no estimate was given in several other countries. Exceptions were in Lebanon, where they estimated that 60 percent of costs are recovered through fees (though this could include fees collected through the private sector, which provides an estimated 80 percent of immunizations in the country), and Senegal, where it was estimated that user fees recover 20 percent to 30 percent of immunization service costs. However, in the case of Senegal, a country participating in the Bamako Initiative, they may have included in this estimate cross-subsidies from charges for drugs and curative care visits. Findings from research on the Bamako Initiative in Guinea and Benin show that, in fact, fees for drugs and consultations covered 40 percent to 50 percent of total operating costs, which include drugs, immunization materials, cold chain maintenance and other operating costs, but excludes vaccines, which are supplied by donors, and staff salaries, which are covered by the government (Soucat et al., 1997b; Levy-Bruhl et al., 1997). Thus, in addition to the user fees being charged for immunization, immunization program costs are clearly being subsidized by charges for other (i.e., curative) primary care services in these two countries, and probably in other countries implementing the Bamako Initiative as well.

Concerning the use of funds recovered from cost recovery mechanisms for immunization services, the respondents to our survey in Guinea reported that the communities participating in the Bamako Initiative used funds recovered from user fees for drugs and consultations to buy 100 refrigerators and 100 motorcycles for outreach activities this year through UNICEF. Similarly, in Benin, a number of health centers opened up amortization bank accounts to save up funds for the replacement of refrigerators (Soucat et al., 1997b). The Ivory Coast reported in our survey that half of the 100 Central/West African franc (CFA) fee for an immunization card stays in the district, and the other half goes back to the central level to finance the printing of new cards.

2.2.2.3 Impact of Cost Recovery on Utilization of Immunization Services

Little information is available on the direct effect of introducing user fees and other cost recovery mechanisms for primary health care services or specifically for immunizations on people's use of immunization services. It has been shown in a number of countries, such as Niger, that user fees and other cost recovery mechanisms for primary health care services can actually lead to increases in utilization, if the fees are used to increase the availability of drugs and for other improvements in quality of care. In Niger, utilization increased not only for curative care services once cost recovery and quality improvements were introduced in two pilot districts; it also increased significantly for preventive care (pre-natal services), since patients coming in increasing numbers for curative services were encouraged to take advantage of preventive care services as well (Yazbeck and Leighton, 1995). The findings from Benin and Guinea, where Bamako Initiative reforms were introduced in large sections of the country, are similar. These reforms included quality improvements and cost recovery for primary health care, as well as extensive outreach activities. During the first four years these reforms were implemented (1989 to 1993), utilization of immunization services increased 42 percent in participating health centers in Benin, and the percentage of children "adequately

covered” (receiving all EPI immunizations by one year of age) increased in the areas covered by the program from 22 percent to 68 percent. In Guinea, the “adequate” immunization coverage rate rose from 22 percent in 1989 to 66 percent in 1993 (Levy-Bruhl et al., 1997). This and other evidence suggest that large sections of populations, even in extremely poor countries, are willing to pay for health services that they perceive as valuable, including immunizations, as long as the perceived quality of services is also acceptable.

2.2.2.4 Summary of Findings

In sum, this review found that while three-quarters of countries surveyed reported the use of cost recovery for at least some health services—mainly hospital and curative care services—a minority of countries (less than 27 percent of the survey sample) are willing to implement formal cost recovery for preventive health services and only 18 percent of the sample of countries reported cost recovery specifically for immunization services. As is the case with cost recovery for primary health care in general, cost recovery for immunization services is most commonly reported in Sub-Saharan Africa—the world’s poorest region—due, in large part, to the Bamako Initiative supported by UNICEF. On the other hand, no country surveyed from the LAC region reported its practice.

The amount of costs recovered for immunization services through such mechanisms as fee per immunization card or per shot are reported to be quite small (e.g., less than 5 percent of total costs). However, the potential to recover immunization costs is greatest where curative care fees are used to cross-subsidize immunization service costs, as is the case in some countries implementing Bamako Initiative reforms. There is little information available on whether fees for immunization services discourage the poorest segments of the population from receiving immunizations. However, findings from some West African countries indicate that, instead of suppressing utilization, cost recovery, if used to improve the quality of services, and if coupled with extensive outreach activities, can actually lead to substantial increases in immunization coverage rates.

2.2.3 Gaps in Information on Immunization Financing

While this review has provided some information on countries’ financing of immunization services, many questions remain, which can only be answered by more in-depth research, such as field-based case studies. Among these questions are the following:

Government share of financing:

- ▲ Given the lack of available information in many countries, what proportion of total immunization program costs are governments really paying for?
- ▲ What has been the impact of decreased donor funding for vaccines and immunization programs on immunization coverage and quality?
- ▲ To what extent is the increased share of government financing for vaccines preventing governments from paying for other necessary immunization program or health program expenditures?
- ▲ What has been the impact of introducing new vaccines into national immunization programs on the

financing mechanisms and available funding for these programs overall? For example, are funds being shifted from other immunization program components or health activities to pay for the new vaccines? What impact has this had? How has adding new vaccines affected the donor-government share of immunization financing?

Cost recovery:

- ▲ What is the actual prevalence of cost recovery (both formal and informal) for immunization services, including cross-subsidization from fees for curative care and drug charges? Is it more widespread than these review findings indicate?
- ▲ Where cost recovery for immunization is taking place, who is using and not using the services? What has been the impact on the quality and effectiveness of immunization services?
- ▲ In countries implementing cost recovery for immunization services, what actual cost recovery rates are they achieving? How can these rates be increased without decreasing utilization and quality?
- ▲ Can cost recovery be a valuable means of enhancing the sustainability of immunization programs, and if so, under what circumstances? What specific cost recovery mechanisms have the most potential for mobilizing additional resources without having a negative impact on immunization coverage and quality?
- ▲ What is the prevalence and potential for financing mechanisms other than user fees to pay for the costs of immunization programs?

2.3 Effects of a Changing Health Sector on immunization Financing

2.3.1 Impact of Health Sector Decentralization on Immunization Financing

The introduction of decentralized management of planning and resource allocation in many countries around the world provides both advantages and disadvantages to the success of national immunization programs. Advantages come in the form of improved access to local financial support for immunization programs as well as transparency and greater accountability to beneficiaries. Disadvantages are the potential for inadequate resource management, the diversion of funds to programs competing for resources, and the fact that district managers may not have the planning skills required to manage an immunization program.

Data were gathered from 10 countries responding to the PAHO E-mail survey on the extent of decentralization in planning and management of immunization programs (*Table 23*). In most of the countries surveyed, decentralized decision making was widely used for program planning for immunizations, although to a lesser extent for budget development. In most countries, most program financing continued to come from the central level.

Table 23. Level of Decision-Making for Planning and Management of National Immunization Programs, Countries Responding to PAHO E-Mail Survey

Country	Level of Program Planning	Level of Budget development	Source of Program Budget
Bolivia	N,R,L	N,R,L	Not available
Brazil	N,R,L	N	N (100%)
Colombia	N,R,L	N,R,L	N (10%),R (30%), L (60%)
Nicaragua	N,R,L	N,R	N (90%),R (10%)
Panama	N,R	N,R	Not available
Peru	N,R,L	N,R	N (100%)
El Salvador	N,R,L	N,R	N (100%)
Honduras	N,R	N,R	N (80%), R (20%)
Surinam	N,R	N,R	N (50%), R (50%)
St Kitts/Nevis	N,L	N	Not available
*N-National, R-Regional, L-Local Source: PAHO E-mail survey			

Due to the concerns about the potential detrimental effects of decentralization on immunization programs, several studies have been commissioned to investigate its impact. WHO and BASICS, for example, have undertaken studies in Uganda, Tanzania, Zambia, and some Eastern European countries such as Ukraine. PAHO has undertaken studies to examine the issue in Colombia and Brazil.

There are three basic issues concerning the effect of decentralization on the financing of immunization program: (1) the effect on allocation of resources for immunization; (2) the effect on how donor funding is utilized, and (3) differences between national and local priorities.

Resources for programs such as immunization programs are often allocated locally under a decentralized system. Since the resources for different services are now in the form of grants and not necessarily earmarked for immunizations, it is less certain that these programs will receive all the funding that is required to carry out their mandates. Immunization programs must compete with other health services as well as with other sectors under local management, and the use of the funds does not always agree with national priorities for immunizations. Local capacity to manage these programs is often inadequate and needs to be strengthened,

particularly in the short term, as countries make the transition to decentralized economies. District health personnel and political leaders are often not familiar with the extent of the costs of immunization programs and have difficulty allocating sufficient resources to the programs.

Donors now have a more complicated task than before to ensure that their funds are channeled appropriately, since they must now monitor the programs at national and local levels rather than only at the national level. The costs of donor-to-government and government-to-government coordination are increasing.

In Uganda, a substantial portion of the government's budget is apportioned directly to districts in the form of grants. The priority given to immunization—as to any other component of primary health care, and to primary health care itself—is determined at the level of the 45 districts, and, in part, at the sub-county level. Although the funding for health under this decentralized system was originally part of unconditional block grants from the Ministry of Finance so that the health sector had to compete with other sectors, there are now two conditional grants—one for health and one for education—that earmark funds for these two sectors. In this context, immunization must compete with other health services and activities but no longer with other program areas outside of health. However, some cases were noted when funds intended for health were being diverted to non-health activities (Weeks, 1997). The areas in which decentralization reform has most affected the national immunization program are outreach and district level supervision for which funding has to compete with other health priorities and is often neglected. As the study on decentralization in Uganda observes, “UNEPI is likely to continue with the characteristics of a top down, vertical programme designed to function within a structure that no longer pertains, unless it decides to reformulate itself to function optimally within the new structure and process” (WHO/BASICS/DANIDA, 1998, Annex 1, p. 84).

As changes in financing mechanisms for immunization occurs, there is a potential for shortfalls in supplies to occur, particularly in the short term. In Tanzania, one consequence of the change in responsibility from the Ministry of Health to the Ministry of Local Governments was that immunization coverage decreased in 1996 due to a shortage of funds for kerosene for refrigerators during the first half of the year (Babaniyi et al., 1997).

After decentralization took place in Zambia, some expenditure on imported items and some local costs—including personnel costs, fuel for sterilization and incineration, in-service training, inputs from district managers, supervisors and store-keepers, and transport—were now funded predominantly through district funds, and, to a lesser extent, through user fees and prepayment schemes (WHO/BASICS/DANIDA, 1998). The advantage is that districts are now responsible for planning health their programs and activities. However, the amounts of funding received by the districts were often lower than approved and agreed upon by the central level, and were received late. For immunization, these two problems resulted in cancellation of outreach sessions and less on-site contact between health workers and their district supervisors.

The effect of decentralization on immunization programs differs from country to country. For example, in Zambia, the District Health Management Teams do not compete directly with other sectors for a share of the funds, while in Uganda, they do. Also, while Zambia has integrated its vertical programs, Uganda has left its vertical programs untouched.

In the Philippines, funds are dispersed from Local Government Units (LGUs). The LGUs have the discretion to use the funding as they wish, and the national immunization program is now competing for resources with several other services, including those of hospitals. One way in which the central Department of Health has decided to insure that immunizations are provided is to provide vaccines to the LGUs (Schwabe and Schwartz, 1993).

In order to respond to changing needs with decentralized systems, some development of appropriate funding mechanisms needs to take place, such as mechanisms that target funding to different levels as appropriate (e.g., some to the district or other sub-national levels, and other parts of the funding to central units). In addition, donors need to adapt to local ambitions and objectives by soliciting local involvement in reaching decisions on how best to spend donated funds.

The experience of several countries undergoing decentralization suggests that some immunization program functions, such as the purchasing and delivery of vaccines, cannot be managed from the local level. One reason is that it is important for a country to negotiate unit costs of vaccines with larger volume in order to keep the price as low as possible.

In conclusion, decentralization varies widely from country to country, and the effects on immunization programs differ. Since health reforms are still being implemented, it is difficult to fully assess their effects on immunization financing. However, it is clear that some negative consequences of the move toward decentralization of health service delivery are occurring. In order to reduce any negative effects that might occur, some change needs to take place to enable the functioning of immunization programs under decentralization to occur more smoothly, including the behavior of donors. Since decentralization is accompanied by reforms that rearrange financial mechanisms, donors must also rearrange their funding mechanisms and practices in these countries.

2.3.2 Role of the Private For-Profit Sector and NGOs in Immunization Service Delivery and Financing

In many developing countries, the for-profit private sector and non-governmental organizations are increasingly becoming involved in the provision of immunizations. However, the two types of organizations play very different roles. NGOs often function like an additional arm of the government by providing services in areas where the government is unable to do so. In many cases, NGOs receive funding from the government to provide additional services and are not contributing independently to service delivery. In other countries, however, they may effectively lower the costs to the government by providing labor and supplies free of cost to the program.

The for-profit private sector, on the other hand, has a more independent role. Private pharmacies and facilities provide services and most of the accompanying costs, and charge fees for their services. From an economic perspective, because immunizations are seen as being both public and private goods—that is, both society and individuals benefit from their use—private providers have a role to play in their provision. This is particularly true if consumers are willing to pay for the services. Increasing the role of the private sector in the delivery of immunization services may be an appropriate financing strategy as donor funding is reduced. However, the extent to which the costs of immunization services are assumed by the private sector and the level to which they are subsidized needs to be further researched to determine whether there are cost savings for the government of this type of service delivery. For instance, in countries where social insurance finances immunizations delivered through the private sector, the argument can be made that the private sector's participation can actually increase the costs to the government, since the vaccines used by private sector providers are often considerably more expensive than those procured through the government.

The participation of the private sector, especially for-profit providers, also usually raised three important concerns among those involved in developing immunization policies. First is the issue of quality and safety, which can vary considerably among private providers and is difficult for many governments to monitor in the private sector. Maintenance of the cold chain in the private sector is particularly a concern in many countries;

some governments, such as Zimbabwe, even provide support to ensure that the cold chain is adequately maintained in private physicians' offices (Madrid, 1998a). Second is the concern of equity of access, since the private sector typically serves the urban elite, as opposed to urban slum dwellers and rural populations for whom, in epidemiological terms, immunizations will have the greatest impact on infectious disease prevention. A policy that some governments have adopted of providing free vaccines to private sector providers could, in theory, improve access to the urban poor, although private providers often charge a consultative or other fee to patients. The difficulty of ensuring accurate reporting of immunization service delivery from private sector providers is a further concern among ministries of health. Unfortunately, good information on the quality of services provided through the private sector as well as on the population served is often not available.

This information on the involvement of the private sector—especially the for-profit sector—is not easily obtainable due to the lack of mechanisms to systematically collect the information in most countries. In addition, the decentralization process taking place in many countries has shifted management responsibility for many projects to the local level, so that less information is available at the central level. Despite the lack of accurate information, some estimates of private sector and NGO participation in immunization programs were obtained through the UNICEF and PAHO E-mail surveys, as well as from other sources.

A breakdown of countries responding to the surveys by the estimated percentage of immunizations provided through the private sector and NGOs is shown in *Table 24* and in *Annex Table A5* (which lists the countries). In most countries where the private sector and NGOs provide immunization services, the estimated proportion of all immunizations that they provide is between 1 percent and 10 percent—this was the response of 26 countries responding to the survey (38 percent). Another 22 countries (32 percent) stated that the private sector and NGOs had no involvement at all in providing immunizations, while 13 countries (19 percent) estimated that more than 10 percent of immunizations are delivered through private sector channels. It must be kept in mind, again, that the survey sample is not necessarily representative of the countries in their regions or of all countries as a whole.

Examining the results by region and by country (*Annex Table A5*), the estimated proportion of immunization services delivered through NGOs and for-profit private providers mirror their role in health care service delivery in general in these countries. The lack of participation of their sector in Eastern Europe and the NIS reflects the fact that a private health sector is just beginning to form in these countries. No private sector participation in immunizations was also reported in a number of communist or ex-communist countries in Asia (Cambodia, North Korea, Mongolia, the Lao PDR), as well as Cuba. The participation of the private sector and NGO in immunization service delivery, however, is important in several large Asian countries, including India and Indonesia (where in both cases an estimated 15-20 percent of immunizations are provided through these channels) and in Sri Lanka (where the estimate is 10-15 percent). In most countries in the LAC region and in Sub-Saharan Africa that responded to the survey, the private sector and NGOs provide only an estimated 1-10 percent of immunizations. Of the five countries in Africa reporting a significant private sector role in immunization service delivery (Rwanda, Somalia, Burundi, Cameroon, and Lesotho), three are war-torn countries where NGOs have become major health care providers in the absence of government services.

Table 24: Estimate of Percent of Immunizations Provided by the Private Sector, including NGOs, UNICEF and PAHO E-Mail Surveys

Region	0%		1-10%		11-25%		Greater than 25%		Don't Know/No Answer		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Asia/Pacific	5	50.0	1	10.0	3	30.0	0	0.0	1	10.0	10	100.0
Eastern Europe/NIS	9	81.8	1	9.1	0	0.0	0	0.0	1	9.1	11	100.0
Latin America/Caribbean*	2	13.3	10	66.7	2	13.3	0	0.0	1	6.7	15	100.0
Middle East/North Africa	3	50.0	2	33.3	0	0.0	1**	16.7	0	0.0	6	100.0
Sub-Saharan Africa	2	11.5	12	46.2	2	7.7	5***	19.2	4	15.4	26	100.0
Total*	22	32.4	26	38.2	7	10.3	6	8.8	7	10.3	68	100.0
<p>* Does not include Caribbean Island countries from the UNICEF survey. ** Lebanon *** Burundi, Rwanda, Lesotho, Somalia, Cameroon</p>												

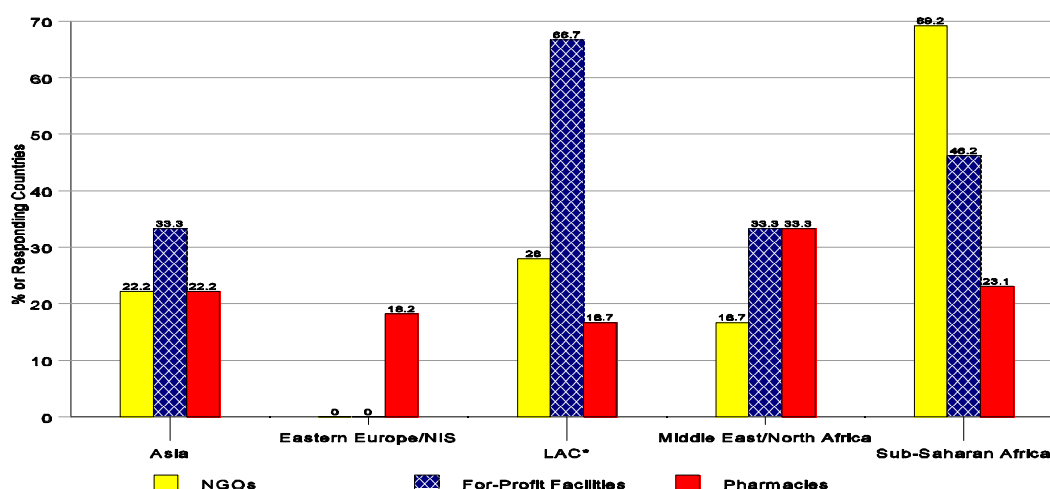
Private providers and NGOs often play a more important role in the delivery of immunization services in urban areas than in rural areas. In a survey conducted in urban areas of Thailand, about a third of respondents reported that they had obtained immunizations directly from private sector sources, while overall in the country the use of private sector providers for immunization services is estimated at 8 percent (Coopers & Lybrand et al., 1997). Similarly, in India, the UNICEF survey respondent reports that as much as 50 percent of immunizations are delivered by the private sector in some urban areas, as compared to 15-20 percent in the country overall. In Bangladesh, NGOs in urban areas also provide an estimated 50 percent of immunizations, mainly because of the lack of public sector providers in the cities, while the government sector is the main provider of immunizations in the rural areas (Rick Yoder, personal communication).

Following sections discuss what types of private providers deliver immunization services. *Figure 4* shows the percentage of countries responding to the surveys that report at least a minimum amount of immunization services provided through NGOs, for-profit health facilities, and/or private pharmacies. These countries are listed in *Annex Table A6*.

2.3.2.1 Role of the For-Profit Private Sector

As shown in *Figure 4* and *Annex Table A6*, the provision of immunization through for-profit private providers appears to be more common in Africa and in the LAC region, and less so in the Middle Eastern countries. The for-profit sector is also an important provider of immunization services in several large Asian countries, such as India and Indonesia. For-profit providers are least active in Eastern Europe and the NIS where the role of the private sector is just beginning to evolve.

Figure 4: Proportion of Countries Responding to the E-mail Surveys Reporting Provisions of Immunization Services through Private Sector Channels



*Does not include the 10 Caribbean countries that responded to the UNICEF survey.

The role of the for-profit private sector in the delivery of immunization services has increased in some countries in recent years. In Nicaragua, for example, the private sector's participation in the delivery of services increased by 179 percent between 1995 and 1996 (PAHO, 1996a).

In some countries, the governments offers for-profit private providers free vaccines as an incentive to provide immunization services and as a means of ensuring the quality of the vaccines delivered through the private sector. Some examples of countries where the government provides free vaccines to private sector facilities or pediatricians are India, Panama, Oman, Zimbabwe, and Nigeria (E-mail survey; Madrid, 1998a). Another incentive that a government can use to encourage the private sector to deliver immunization services is to provide insurance coverage for these services. For example, the government of Korea covers all of its population with medical insurance, including the cost of immunization services obtained through the private sector (Percy, Brenzel and Waty, 1991).

In several Sub-Saharan African, some Latin American and a few other countries, private pharmacies also provide immunizations (see *Figure 4*). In these countries, however, these pharmacies need to obtain approval to sell vaccines. In some cases, private pharmacies provide vaccines that are not available through other outlets. For example, in Uzbekistan, the Hepatitis B vaccine is obtainable only through private pharmacies.

Some researchers have also examined the role of the for-profit private sector in terms of its influence on government decisions to incorporate additional vaccines into national immunization programs, since vaccines such as Hepatitis B and Hib are often first introduced into a country through the private health sector. A three-country study by Yvette Madrid found, however, that in most cases the private sector's influence was not a significant factor in getting countries to add new vaccines to their programs (Madrid, 1998a-c). The private sector, did, however, have a strong influence in some countries (e.g., Thailand) on the specific type of vaccine that the government selected and on the price that it paid (Madrid, 1998c).

2.3.2.2 The Role of NGOs in Immunization Programs

NGOs play an important role in the provision of immunization services in many countries, often providing services in locations where the government has gaps in coverage. Their activities range from direct provision of immunizations to support activities such as promotion, social mobilization, training, and disease surveillance.

As shown in *Figure 4* and in *Annex Table A6*, NGOs provide immunization services in many countries in Sub-Saharan Africa. As mentioned above, in a few countries, mostly post-conflict countries such as Rwanda, Somalia, and Lebanon, NGOs provide a substantial proportion of all immunization services.²⁴

Although information is lacking, NGOs are reportedly involved in supporting immunization programs in several Latin American countries, either directly providing services or assisting with support services, such as disease surveillance. According to PAHO, the number of NGOs that support national immunization programs range from only seven in Guatemala to 40 in El Salvador and 68 in Bolivia (PAHO, 1997g).

2.3.3 The Impact of Polio Eradication Programs on Immunization Financing

Relatively few studies have examined the impact of the worldwide polio eradication program on routine immunization programs, and, among those that have, considerable controversy exists. The findings of the Taylor Commission study in Latin America, for instance, indicate that the polio eradication effort has had a mixed impact on routine immunization programs (PAHO, 1995). While the program has had a positive impact on routine programs because of its social mobilization activities and focus on improving management, it may have had a negative impact on the availability of resources for routine services, especially during the mass campaigns. However, other studies dispute the fact that the impact was as negative as suggested in the follow-up article by Taylor, Cutts and Taylor (Taylor, Cutts and Taylor, 1997; Sutter and Cochi, 1997).

General agreement exists that National Immunization Days have increased the visibility and awareness of immunizations, especially polio immunization. The social mobilization activities in countries in preparation for NID and Sub-National Immunization Days have reached a wide audience. In Cambodia, for example, it was noted that provinces that were not included in the Sub-National Immunization Days reported a surge in demand for immunization services following the social mobilization activities (Aylward et al., 1997).

The focus on the eradication of polio has also increased resources for national immunization programs as a whole. Funding has come from United Nations organizations, the non-profit private sector (e.g., Rotary International), several bilaterals, and local organizations. In the Philippines, for example, the NIDs were supported by the business community in the form of financial commitments as well as in-kind resources (use of offices and vehicles). The polio eradication campaign is strengthening the cold chain in many countries by increasing the resources available for the purchase of new cold chain equipment (M. Dicko/WHO, personal communication). Some estimates suggest that as much as 12 percent of the total costs of NIDs in certain

²⁴The respondent in Somalia estimated that 80 percent of immunization services are provided by non-government providers, largely NGOs. The respondent in Lebanon also estimated that 80 percent of all immunizations are provided through various private sector providers (NGOs, for-profit health facilities, pharmacies).

countries are spent on reinforcing the cold chain and buying freezers, cold boxes and vaccine carriers (M. Dicko, personal communication).

On the other hand, NIDs have had some negative effects on routine immunization programs. They have resulted in greater wastage of resources and taken away resources from planning and management of routine activities. During NIDs in one country, it was reported that routine health care activities were stopped, and the time lag for issuing the quarterly immunization report increased (Weeks, 1997). In addition, it was noted that placing too much emphasis on acute flaccid paralysis in disease surveillance would make the surveillance system more costly and short-lived.

Another factor is the equipment that is purchased for NIDs may not be appropriate for long-term use. The equipment purchased for NIDs, for example, often include cardboard vaccine carriers for temporary refrigeration that only last for short periods. While these can be used for one-day NIDS, they are not appropriate for long-term routine use. Thus, cold chain purchases for disease eradication programs do not always constitute a long-term investment for national immunization programs.

2.3.4 Gaps in Information

Several gaps in information were identified in examining the effects of the changing health sector on immunization financing. Regarding the effect of decentralization, the role of the for-profit private sector and NGOs, and the impact of disease eradication programs on immunization financing, the following questions remain:

- ▲ To what extent are flows of funds in decentralized health systems covering immunization program costs previously funded directly by the central ministries of health?
- ▲ To what extent and how have resources been mobilized at the local level for immunization services in countries with decentralized health systems?
- ▲ To what extent is the private sector involved in the delivery of immunization services, especially in countries with decentralized health systems?
- ▲ What impact does the involvement of the private sector in immunization service delivery have on public sector spending? Does the participation of the for-profit private sector and/or NGOs significantly lower the costs to the government?
- ▲ What is the impact of increased private sector participation in immunization service delivery on the equity of access to services, on coverage, and on the quality and safety of services?
- ▲ How have polio eradication activities affected the availability of resources for routine immunization programs? How can disease control campaigns be designed and implemented to benefit routine immunization programs and to minimize any negative effects on the management and financing of routine immunization activities?

2.4 Country Experiences with Mechanisms to Facilitate Vaccine Financing

As donor funding for vaccines has declined since the end of the Universal Child Immunization initiative of the 1980s, and as new, relatively expensive vaccines become available, there has been increasing international pressure for countries to decrease their dependence on donors to finance their vaccine needs. Three main mechanisms have been established to assist countries to assume greater financial responsibility for vaccines. These are: (1) the vaccine Revolving Fund established by PAHO, (2) the Vaccine Independence Initiative set up by UNICEF, and (3) the European Union Initiative established in seven countries in West Africa. The number of countries participating in these initiatives has grown considerably in recent years—Brazil just joined the PAHO Revolving Fund in late 1997, and the EU Initiative only began in mid-1996. This growing trend is partly the result of the “banding strategy” developed in 1994 by WHO and UNICEF, in which countries are grouped into one of four bands (A-D), based on their relative wealth (gross national product [GNP]/capita), overall GNP, and population size, and donor support for vaccines is targeted to countries most in need.

Given the growing importance of these mechanisms in financing countries’ vaccine supplies, following sections will describe these mechanisms and review available information on countries’ experiences with them. The main features of each mechanism are summarized in *Table 25*.

As mentioned in Section 1.3 above, the main means by which many countries obtain their vaccines—direct procurement from suppliers, either through a international tender and bid process or through deals with individual domestic or international suppliers—was not examined in detail for this review, due to time constraints and the limited amount of information available. Given its importance in the sustainability of financing of vaccines, this topic needs to be studied in detail and will be examined in the PHR country case studies. This review also does not investigate country experiences with World Bank and other loans as a means of financing vaccines and immunization programs—another area that merits further study.

Table 25: Main Features of the PAHO Revolving Fund, VII and EU Initiative

Feature	PAHO Revolving Fund	VII	EU Initiative
Procurement mechanism	PAHO procurement system	UNICEF procurement system	UNICEF procurement system
Commodities that can be purchased	Vaccines, syringes, some cold chain equipment (e.g., vaccine carriers)	Vaccines	Vaccines
Type of revolving fund	Common regional fund	Individual country revolving funds (with fixed limits for each country). No revolving fund in countries with modified VII agreements	Same as VII (individual country revolving funds with fixed limits for each country)
Budget line item required?	Yes	Vaccines must be in government budget (not necessarily separate line item). Line item is encouraged.	Yes
Payment terms for countries	Local or hard currency accepted from countries (depending on contract). Payment required after goods delivered (within 60 days of receipt of invoice).	Local currency accepted in countries where UNICEF country program can absorb sufficient local currency; hard currency required in countries with small or no UNICEF program. Payment required after goods received (45-60 days upon receipt of invoice).	Countries pay in CFA which are tied to the French franc. Payment required after goods received (45-60 days upon receipt of invoice).
How revolving fund is capitalized	PAHO and other donor contributions made into common fund	Donor contributions to individual country revolving funds or to general fund	Same as for VII
How vaccines are paid for	Government financing (budgetary allocations), with donor contributions in less developed countries.	Progressive share of government financing over time; donor vs. government financing tracked.	EU structural adjustment grants added to general revenues are used to pay for vaccines; government vs. structural adjustment funding not tracked separately.

2.4.1 The PAHO Revolving Fund

2.4.1.1 Description of the Fund

The PAHO/EPI Revolving Fund, which began in 1979, was the first mechanism established to assist countries to become more self-sufficient in purchasing vaccines and related supplies and equipment. The fund is a reimbursement mechanism designed to ensure a steady supply of vaccines to countries through the continuous availability of hard currency in a common fund for the purchase of vaccines. The fund allows countries to pay for vaccines in local currency and only after the commodities are delivered, thereby eliminating two major obstacles—the lack of hard currency and the need to pay in advance—that developing countries often face in purchasing vaccines on the open market.

Through this mechanism, each participating country submits to PAHO annual action plans projecting their vaccine needs for the year. PAHO then consolidates the orders, places the bids to international tender, and establishes annual contracts with manufacturers approved in principal by WHO to supply and deliver the various vaccines to each country. As the orders for each country are placed each quarter, PAHO pays the vaccine suppliers with money from the common fund, which is capitalized in U.S. dollars. After the goods are

received and PAHO sends an invoice, countries have 60 days to reimburse the fund in local currency for the cost of the vaccines, shipping, and a 3 percent service charge. PAHO then recapitalizes the fund in U.S. dollars. Countries can not place additional orders until they have repaid the fund to prevent depleting the balance of the working capital. As of August 1997, the fund has been capitalized at the amount of \$7.2 million, with financial contributions from PAHO, USAID, the Netherlands, and several participating countries.

According to PAHO, the Revolving Fund provides a number of benefits in addition to assuring a more constant and adequate supply of high-quality vaccines to countries and offering generous credit terms. These benefits include:

- ▲ Requiring countries to plan and budget their vaccine needs on a yearly basis, with technical assistance from PAHO, thus helping to prevent disruptions in supply;
- ▲ Low vaccine prices, as compared to the open market, which PAHO is able to negotiate with suppliers because of large volume buying and the securing of annual contracts. (PAHO has claimed cost savings in the past of up to 80 percent [Carrasco et al., 1983];)
- ▲ The fact that the funds for all participating countries are pooled into a common fund, which allows reallocation of funds between countries, if, for example, countries require less funding than they were originally allocated because of speedy payments. This flexibility makes it possible to respond to countries' needs, especially new countries just joining the program. In addition, once the Fund is adequately capitalized, no additional money is needed, unless the volume of purchases grows.

2.4.1.2 Current Status and Progress of the Fund

As of December 1997, all but four countries in the PAHO region (Argentina, Colombia, Venezuela, and Chile) were participating in the Revolving Fund.²⁵ As mentioned above, Brazil just recently joined the fund. From 1979 to 1991, annual procurement of vaccines (including OPV for polio eradication) through the fund grew from 38.9 million doses to 141.3 million doses—an increase of 263 percent—and was 83.9 million doses in 1996 (after polio campaigns in the region had ended) (PAHO, 1997d). Besides vaccines, countries are also buying syringes and cold chain equipment through the fund. Countries at first continued to receive a portion of their vaccines free from UNICEF and gradually increased their financial contribution for vaccines. Most participating countries now pay for 100 percent of their vaccine supplies, although several use funds from donor projects to finance some of these costs. Exceptions are poorer countries, such as Haiti and Bolivia, which continue to rely heavily on donors for vaccines.

Capitalization provided by donors and participating countries has also grown—from \$2.3 million in 1983 to \$7.2 million in 1997 (PAHO, 1997b). Countries are also now buying new vaccines through the Fund, which currently has contracts with suppliers for Hepatitis B, Hib, and MMR.

²⁵Mexico, which produces its own vaccines, buys from the fund periodically when its own production is insufficient to meet its needs.

2.4.1.3 Assessment of the Revolving Fund

Although countries assess their national immunization programs each year and discuss their findings at an annual PAHO meeting, there has not yet been an independent evaluation of the PAHO Revolving Fund program. According to an article in the *WHO Chronicle* in 1983, the fund experienced difficulties early on in the program before it was sufficiently capitalized, including disruptions in immunization activities due to delays in placing orders and operational limitations due to limits on buying cold-chain equipment and vaccine supplies (Carrasco et al., 1983). Although these disruptions have reportedly diminished, the fund is still not sufficiently capitalized at certain times of the year to cover all countries' vaccine needs for both routine immunization services and campaigns. Consequently, when the fund is low, countries are required to pay in advance for their orders (PAHO, personal communication).

The fund on the whole is considered to be very successful within the international health community. According to UNICEF, “[The Revolving Fund] has been instrumental in achieving the high coverage rates and the virtual eradication of poliomyelitis in the Western Hemisphere” (UNICEF, 1992).

Another positive effect of the fund, according to PAHO data, has been the maintenance or decrease over time of vaccine prices that PAHO negotiates with suppliers, due to the large volume that they buy. Prices for most vaccines purchased through the program have also decreased in the last year, which PAHO attributes at least in part to the fact that Brazil, with its population of 161 million people, has joined the fund, significantly increasing the volume that they buy from suppliers. In 1997 and 1998 prices for the basic EPI antigens decreased 18 percent per dose for the 20-dose vial of BCG, and 6-8 percent for the 10-dose vial of measles, the 10-dose vial of BCG, and the 10-dose vial of DPT (PAHO, personal communication). Most significantly, PAHO was able to negotiate down the price for Hepatitis B vaccine from around \$7 per dose, which suppliers quoted in 1997, to \$.82 per dose this year, once Brazil placed a request for 48 million doses, 97 percent of the entire Hepatitis B supply ordered through the fund for this year.

2.4.2 The Vaccine Independence Initiative

2.4.2.1 Program Description

Based on the success of PAHO's Revolving Fund, UNICEF established the Vaccine Independence Initiative in 1991 jointly with WHO. The impetus for setting up this program was the realization that UNICEF and donor financing could not cover the increased demand for routine EPI vaccines—projected to increase over 70 percent from 1991 to 2000—nor the anticipated demand for new vaccines (UNICEF, 1992). The stated objectives of the initiative when it began were to increase the self-reliance of middle-income countries to finance their immunization programs, and to free up government as well as donor funding to pay for the introduction of new vaccines (UNICEF, 1991). When conceived, UNICEF saw the VII as a means of assisting countries to finance their basic EPI vaccines, as well as a way of assisting countries already financing the basic antigens to be able to procure new vaccines. By helping to facilitate sustainable financing of the traditional EPI vaccines, countries would be more willing to add new vaccines to their immunization programs without fear of disruptions in their basic vaccine supply.

The countries originally targeted for this initiative were middle-income countries with functional immunization programs (as indicated by at least 50 percent coverage for all basic antigens), such as Egypt, Pakistan, the Philippines, Morocco, and Zimbabwe. UNICEF anticipated that by 1996, a total of 24 countries

would be participating in the program, buying around \$21 million worth of basic EPI vaccines and another \$22 million worth of Hepatitis B vaccines (UNICEF, 1992). The required capitalization for this level of participation was estimated at around \$22 million.

The basic features of the program are similar to those of the PAHO Revolving Fund. These include dollar-based revolving funds which serve as lines of credit for governments that are unable to make advance payments for vaccines on a consistent basis. For each country, the fund is capitalized on a one-time basis in U.S. dollars either from the general revolving fund or through country-specific contributions made by donors. The program uses UNICEF's centralized procurement system, in which participating countries place orders to UNICEF each quarter, and the commodities are shipped directly by the manufacturer to the country. Countries can reimburse the fund in local currency (with certain exceptions) and have 45 to 60 days upon receipt of the invoice to pay. The initiative also requires countries to plan their vaccine needs on an annual basis, with technical assistance, and requires that vaccines be included in national budgets to help ensure that vaccine funds will not be diverted to other uses. Specific vaccine line items in national budgets are encouraged but not required.

The amount of vaccines a country can purchase with local funds is limited by UNICEF's capacity to absorb local currency for its in-country activities. For this reason, UNICEF was unable to accept local currency from Mongolia, which was considering entering the program. Other countries where this is also a problem, including the Central Asian republics of Kazakhstan, Uzbekistan, and Turkmenistan, have joined the VII, but pay for the vaccines in hard currency.

Unlike the PAHO Revolving Fund, which is a common fund into which all country allocations are placed, the VII essentially operates a separate revolving fund for each country. Each country is given a ceiling on the value of vaccines that they can have in outstanding orders or payments at any one time, which they cannot exceed. Although this limits the amount of fund shifting that can occur between countries (e.g., to start up a new country before its fund is fully capitalized), there is still some flexibility in the system. For example, once the Philippines ended an intensive period of immunization campaigns, their vaccine needs were reduced substantially, freeing up VII funds that were then reallocated to other countries (Judy Polsky, UNICEF, personal communication).

2.4.2.2 Current Status and Progress of the VII

Since the program began in 1991, 20 countries, including 12 Pacific Island countries, have joined the VII. Besides the Pacific Island countries, these countries are: Morocco, the Philippines, and Bangladesh, which all have revolving funds and pay in local currency, and Ghana, Uganda, Kazakhstan, Uzbekistan, and Turkmenistan, which have modified VII agreements (i.e., no revolving fund), as described below. In addition to these 20 countries, the seven West African countries participating in the EU Initiative have access to the VII, as described in Section 2.4.3. Although the initiative was originally targeted towards middle-income countries, which are in a better position to self-finance their vaccine needs, many of the countries originally targeted chose instead to procure their vaccines directly from suppliers, since they were large enough to negotiate reasonable prices on the international market, and have access to hard currency. These countries include Egypt, Pakistan, Nepal, Syria, Zimbabwe, and Sri Lanka.

A modified version of the VII is being implemented in three Central Asian republics (Kazakhstan, Turkmenistan, and Uzbekistan), as well as in Ghana, and, most recently, in Uganda. Following the break-up of the Soviet Union, the Central Asian republics, which had depended on their vaccine needs almost entirely from Russia, began experiencing serious disruptions in their vaccine supplies, due to huge price increases

from Russian suppliers, new demands for payment in hard currency, and other factors. In each of these countries, a deal was worked out between UNICEF, the national government, and the Japanese government in the mid-1990s to co-finance vaccines supplied by UNICEF to supplement those procured from Russian producers. These arrangements call for the governments to increase their share of the financing each year and to reach total self-reliance for vaccine procurement by the year 2000 or so. For example, the agreement for Kazakhstan called for the government to contribute 3.6 percent of the cost of the vaccines supplied through UNICEF in 1995, while the Japanese would contribute 88 percent and UNICEF about 8 percent. By 1998, UNICEF's share would be zero and Japan's share reduced to 34 percent, and, by 2000, the Kazakh government would pay for all of its vaccine needs (UNICEF, 1994a). UNICEF could not accept payment in rubles, due to the fact that its local programs could not absorb the levels of local currency that would be involved, and thus the vaccines for these three countries are paid for in hard currency. The terms of the agreements also call for payment from the governments in advance for the entire year, forgoing the need to establish revolving funds for these countries.

In Ghana, a "vaccine stabilization fund" has been established through the VII mechanism to purchase emergency supplies of vaccines to respond to disease outbreaks and to cover shortfalls in vaccines. Ghana buys its routine vaccines through the UNICEF procurement system, which requires payment in advance in hard currency. The VII allows the country to order emergency supplies and to pay for these in local currency after the goods are received. In 1996, Ghana used the vaccine stabilization fund, which has been capitalized with \$500,000 provided by USAID, to buy more than 2 million doses of yellow fever and meningitis vaccines, as well as needles and syringes during outbreaks of these diseases. Thus far, repayments have been made to the fund in full within approximately two months of the purchase (UNICEF, 1997b). Uganda joined the VII in 1997, buying 49 percent of its vaccine needs that year with local currency.

As of the end of 1997, the VII has been capitalized at the amount of \$8.4 million. Seventy-one percent of these funds are for use in the general revolving fund, and the remaining 29 percent are committed to specific countries (UNICEF, 1997b). Up to the end of 1997, \$40 million dollars worth of vaccines had been purchased through the program since it began procuring vaccines in 1993.

2.4.2.3 Assessment of the VII

One of the major objectives of the VII was to increase the self-sufficiency of countries to finance their routine vaccine needs. As measured in terms of country participation in the VII, fewer countries than UNICEF originally anticipated have joined the program, especially larger, middle-income countries. However, six of the countries originally targeted for the VII decided to procure their vaccines directly on the open market. Counting these countries and those participating in the VII and the EU Initiative, 21 countries—many of which were largely dependent on UNICEF and other donors for financing their vaccine needs—plus the Pacific Island nations, now include vaccines in their annual budgets and several (including Morocco, the Philippines, Bangladesh, the Pacific Islands, Ghana, and three Central Asian republics) are financing all or a significant portion of their vaccine supply. The VII can therefore be considered successful in meeting its goal of increasing the self-reliance of countries to finance their routine vaccine needs. The VII has been less successful, however, when it has involved poorer countries that are far from achieving self-reliance in buying vaccines. Burundi and Tanzania, which joined the VII in 1994 and 1995, respectively, and which began financing 3 percent to 10 percent of their vaccine needs, have had to withdraw from the program temporarily, as they were unable to continue budgeting for vaccines on a regular basis (UNICEF, 1997b).

By requiring a line item for vaccines in government budgets, the VII has also helped increase the commitment of participating governments to set aside funds for their national immunization programs each year, thus decreasing the likelihood of these funds being diverted for other uses.

Another objective of the VII was to free up donor funds previously used for basic EPI vaccines to pay for additional vaccines. More and more countries have introduced new vaccines, especially Hepatitis B and yellow fever, into their national immunization programs in the last several years, including a number of VII countries. The Philippines and the three Central Asian republics participating in the VII have added Hepatitis B to their national programs; however, they are either purchasing them directly on the open market through a tender and bid process (the Philippines) or buying them directly from manufacturers (the Central Asian countries). Morocco has begun in fiscal year 1998/99 to purchase small amounts of Hepatitis B through the VII to immunize high-risk groups (health workers, prisoners, orphans, etc.) and plans to purchase sufficient supplies of the vaccine to immunize all newborns within two to three years, either through the VII or directly from suppliers. It does not appear, therefore, that donor funding in these VII countries has been used to help them purchase new vaccines. One exception, however, is the Pacific Island countries, which are financing most of their basic EPI vaccines themselves through the VII, but which have received free supplies of Hepatitis B vaccine (HBV) from Australia and New Zealand. The plan, however, is for these countries to contribute gradually to the cost of HBV over the next few years and to pick up the total costs by the year 2001 (UNICEF, 1997b).

In addition to the number of countries participating in the VII and the proportion of vaccine costs countries are now financing, one must also review the countries' experiences with the VII and its impact on vaccine supply, immunization coverage rates, and funding for other health programs to determine the success of the program. However, to date, there has not been a general evaluation of the VII and only one country-specific assessment, which took place in Morocco—the first VII country—early in the program (Woodle, 1994; Polsky, 1994). From the Morocco reports, conversations with key informants, and other documents, however, some general observations can be made on country-level experience with the VII.

The VII began in Morocco in early 1993, with initial capitalization from USAID. By 1995, the government had assumed the full costs of its routine vaccine supply using funds from a World Bank loan. The VII has been credited with helping the government establish a secure budget for vaccines and with improving the country's capacity to forecast and plan its vaccine needs. A joint UNICEF/USAID evaluation in mid-1994 highlighted a number of problems, mainly bureaucratic, with the operation of this pilot program in Morocco (Woodle, 1994; Polsky, 1994). One significant problem is that a waiver to exempt foreign vaccines from import and value-added taxes and customs duties had not been granted by the Moroccan government, as had been expected when the country joined the VII. These taxes and duties, which at one point amounted to 57 percent of the value of the imported goods, were not included in the government's vaccine budget, and consequently the government was threatening to take these taxes out of the MOH budget, which would significantly reduce the amount of vaccines that it could purchase through the VII. Second, due to billing delays by UNICEF of up to five months, coupled with delays in payment from the government, it was taking more than eight months to replenish the fund; that is, from the time the request was made until payment by the government. Another problem identified during the assessment included political pressure from the local, quasi-government supplier (Institut Pasteur), which had been supplying up to one-half of the country's vaccine needs and which the government had completely cut out to purchase all of its vaccines through UNICEF. Currency exchange problems were also mentioned, since the local currency value of the vaccines (which are purchased by UNICEF in dollars) would change between the time the order was placed with UNICEF and the time the government paid the bill, as a result of changes in the dirham/dollar exchange rate in the interim.

Since the assessment was conducted in Morocco, the functioning of the revolving fund has improved significantly. The time it takes to complete a cycle has been reduced to six months, allowing the country to use twice the value of its capitalization (\$1.1 million) per year to purchase \$2.2 million worth of vaccines.²⁶ The Moroccan government has never defaulted on a payment and only once—in the fall of 1997—was the revolving fund low enough to almost cause a disruption in vaccine supply. At the time, there were nearly \$900,000 in outstanding orders or payments, due to delays in shipments and in government payments. This left the government with insufficient funds to purchase enough polio vaccine in time for the 1997 National Immunization Days. An advance from UNICEF and a quick payment of one of the outstanding bills averted a crisis in the short term. Changes in UNICEF billing practices—in which invoices are now submitted to the government after each delivery instead of after the last delivery for a given order, thereby increasing the frequency of payments and thus the cash flow—should help prevent further problems in the long term. The currency exchange problem was also alleviated in 1997 when the annual VII contracts began stipulating fixed exchange rates for the entire year.

The tax situation has also been alleviated with a new law enacted in July 1997; customs duty for vaccines has been eliminated and the import and value-added taxes reduced to 9.75 percent, significantly lower than the 57 percent combined duties and taxes of the past (K. Krasovec, PHR, personal communication).

One question that remains concerning the VII in Morocco is what impact 100 percent government financing of vaccines—albeit through a World Bank loan—is having on the financing of other components of the national immunization program (e.g., cold chain equipment and other program requirements), as well as on the financing of other health programs and activities.

2.4.3 The European Union Initiative

2.4.3.1 Program Description

The EU Initiative is a three-year project that began in 1996 in an effort to secure adequate supplies of vaccines for routine immunization programs in the West African countries of the Sahel. The initiative, carried out in conjunction with structural adjustment financial support (grants) provided by the EU, requires that each participating country create a budgetary line item specifically for vaccines. Upon negotiations with the EU, each country prepares each year a national vaccine budget using structural adjustment funding from the EU to purchase the six traditional EPI antigens through UNICEF's VII mechanism. (Newer vaccines, such as Hepatitis B, can not be purchased through this initiative.) As with other VII countries, participating countries place orders with UNICEF from one to three times per year and UNICEF pays the vaccines suppliers for the orders using country-specific revolving funds, which have been capitalized by various donors. Once a vaccine shipment arrives in a country, the government reimburses UNICEF in CFA using structural adjustment funds from its health budget. In addition to the VII revolving fund, a regional fund has been established in Brussels with nine million ECU in capitalization to provide funding to participating countries in cases where the structural adjustment funding is insufficient to cover vaccine purchases or is not released on time.

²⁶The information in this paragraph was obtained during a PHR visit to Morocco in October 1998 to begin a country case study on immunization financing.

Although all of the funding for the vaccines initially comes from the EU structural adjustment support, over time, the countries are supposed to assume a greater proportion of the financing of vaccines and vaccine supplies.

Besides providing financial support for vaccine purchases, the EU Initiative also provides training and technical assistance to each participating country in immunization program planning, projecting vaccine needs, developing financial systems for vaccine purchases, among other areas. This technical support is provided via a Regional Technical Support Unit, located in Burkina Faso, which also serves as a venue for workshops, meetings, and other fora for information dissemination and exchange between participating countries.

2.4.3.2 Current Status and Progress of the Initiative

Thus far, seven countries have joined the EU Initiative, having established immunization or vaccine budgetary line items and finalized two-year agreements with UNICEF on the procurement of vaccines and supplies. These countries are: Cape Verde, Senegal, Burkina Faso, Mali, Niger, Chad, and Mauritania. These countries are currently in the process of renewing these agreements. According to UNICEF, all participating countries are now making purchases through UNICEF with 100 percent repayment rates (UNICEF, 1997b). However, all participating countries are thus far depending largely on EU structural adjustment funding to make these purchases (Miloud Kaddar, personal communication).

2.4.3.3 Assessment of the EU Initiative

Since the initiative has only been in operation for less than two years and parts of the program, such as the Regional Support Unit, are still in the process of being developed, it has not been formally assessed. However, several individuals familiar with the initiative, including representatives from participating countries, have expressed concern about certain aspects of the design or implementation of the initiative (Malle et al, 1997; Kaddar, 1998). These concerns include:

- ▲ The fact that there is at present no way of tracking the governments' contribution to vaccine financing, since structural adjustment support funds are deposited directly into the Treasury, along with funds from the national governments. This also provides a disincentive for national governments to increase their contribution to financing their immunization program;
- ▲ The over-emphasis on vaccine budgeting and financing, and decreased attention to overall immunization program performance and coverage.
- ▲ The over-emphasis on the part of donors on the financing of vaccines, as opposed to other key immunization program and health sector inputs, such as cold chain equipment and maintenance, training, and supervision. The fear is that countries may be neglecting funding for these critical areas to fully finance their vaccine supplies (with EU support). It has been reported in Chad, for example, that, while the government has made its repayments to UNICEF for vaccines, it has had difficulty paying its health workers for long periods of time in the past few years (Judy Polsky, personal communication);
- ▲ The fact that some countries are using government funds to buy new vaccines, while depending on EU financing for the traditional EPI antigens. The Senegalese government, for example, is

reportedly buying Hepatitis B vaccine on the open market while depending on the EU Initiative to finance the traditional EPI vaccines (Miloud Kaddar, personal communication);

- ▲ As is true for other countries participating in the VII, bureaucratic problems on the part of the governments, UNICEF, and the EU concerning the functioning of the revolving funds. These include delays by UNICEF in sending invoices to the countries, and currency exchange problems stemming from the often large differences in local currency amounts from the time the orders are placed to the time the final invoice is received (Kaddar, 1998). The fact that all three parties have different procedures and policies have also caused bureaucratic delays;
- ▲ The fact that, according to several country officials, the spending limits of the revolving fund for each country are not sufficient to cover the countries' vaccine needs for the six month period (on average) between purchases. The budget allocations may also be insufficient. Another concern is that the amount of funds available for each country via the VII revolving fund was based on objectives in coverage that were considered achievable by the countries, but which fall far short of the actual vaccine needs, if 100 percent immunization coverage is to be achieved. UNICEF/New York, however, says that the size of the revolving funds can be increased to accommodate improvements in immunization coverage (J. Polsky, personal communication);
- ▲ The fact that the countries' plans do not include a gradual increase in government contribution of financing and a parallel withdrawal of donor support. Consequently, once the project ends, the vaccine financing situation in these countries may be the same as it was before the initiative started.

Despite these concerns, UNICEF/New York states that considerable effort has gone into improving the financing of vaccines through this program and that funding of vaccines in the EU Initiative countries is much more secure than it has been in the past.

2.4.4 Gaps in Information

There is to date limited information available on countries' on-the-ground experiences with these mechanisms to facilitate vaccine financing, as well as with direct procurement of vaccines and with World Bank loan projects that include vaccine and immunization program funding. Some of the questions that remain to be answered are:

- ▲ What has been the impact of increased government share of vaccine financing through these mechanisms on vaccine supply? Have disruptions or shortages of vaccines increased or decreased since countries joined these programs?
- ▲ What key country or other factors improve or hinder the success of these financing mechanisms?
- ▲ What impact do these mechanisms have on the long-term sustainability of country financing of vaccines and national immunization programs, especially the VII and EU Initiative, which were conceived as temporary measures? How will the EU Initiative countries be able to finance their vaccines once the program ends?
- ▲ What improvements can be made to each of these mechanisms in: (a) their operation, to ensure sufficient cash flow and minimize vaccine shortages; (b) ensuring the long-term sustainability of vaccine and immunization program financing; and (c) ensuring that increased government financing

of vaccines does not result in insufficient funding of other critical immunization program components?

- ▲ What other barriers to the long-term sustainability of country financing of immunization programs are these mechanisms not addressing?
- ▲ What have country experiences been with direct procurement of vaccines? Under what circumstances or conditions is direct procurement more beneficial to countries than participation in one of these programs?
- ▲ What have country experiences been with using World Bank loans to finance vaccines and national immunization programs? What impact do these loan projects have on the long-term sustainability of immunization programs?
- ▲ Have governments taken a greater interest in vaccine forecasting and management as they finance a greater share of their vaccine needs? Have vaccine wastage and other inefficiencies been reduced as a result of increased government financing?
- ▲ Are there other potential mechanisms, such as endowments or trusts, that could be attempted to improve the long-term sustainability of country financing of vaccines and immunization programs?

3. Summary of Major Findings and Gaps in Information

3.1 Major Findings

The main findings of this review include the following:

Costs of Immunizations:

- ▲ The literature review reveals that while a number of studies on the cost of immunization programs in developing countries were conducted in the 1980s, few have been carried out in the 1990s. The cost studies from the 1980s show that costs per fully-immunized child vary widely, depending on the delivery strategy used (fixed facilities, mobile services or mass campaigns), and the local costs of personnel and vaccine procurement and distribution. One generally accepted average cost for fixed facilities is \$15 per fully immunized child for the traditional six EPI antigens (BCG, DTP, polio, and measles vaccines).
- ▲ Although it is known that the cost per dose of newer vaccines is significantly higher than those of routine vaccines and presents more of a challenge to developing countries in terms of financing, less is known about the additional operating costs (e.g., cold chain, storage, additional service delivery costs, social mobilization, etc.) of incorporating these vaccines to immunization programs.
- ▲ Information on the total recurrent costs of immunization programs (including vaccines, syringes, transport, cold chain maintenance, social mobilization, etc.)—even without personnel costs—is much less available in general than information on vaccine costs. In our survey, nearly one-half of the UNICEF survey respondents (33 countries) were not able to provide this information or obtain it from the government. This information was more available, however, in the LAC region, due to the fact that each country participating in the PAHO Revolving Fund must prepare annual action plans showing funding by source and program component.

Financing of Vaccines and Immunization Programs:

- ▲ More and more countries are financing at least a portion of their vaccine costs and many now have immunization or vaccine line items in their government budgets. In our E-mail survey sample of 78 countries, more than one-third (36 percent) reported that they finance 100 percent of their vaccine supply. As expected, there are large regional variations in the level of self-reliance in vaccine financing—while 18 of countries surveyed in the LAC region (72 percent) reported that they are self-reliant in vaccine financing, only three countries from the Sub-Saharan Africa sample (11.5 percent) are. Three-quarters of the overall sample of countries reported having a specific immunization program or vaccine budgetary line item.

- ▲ Few countries in the E-mail survey (only four out of 78, or 5.9 percent) reported financing 100 percent of their total immunization program costs. Most countries, including better-off countries that pay for all of their vaccine supply, still depend at least to some extent on donor funding for program support activities such as training, disease surveillance, cold chain equipment and maintenance, supervision, and social mobilization. Even a relatively well-off country like Brazil received some funding from donors in 1997 for disease surveillance and training activities. However, at least part of this funding from donors, especially in the wealthier countries, may be associated with the worldwide polio eradication campaign or other international disease control efforts.
- ▲ A number of countries—especially middle-income countries—are financing the introduction of additional EPI vaccines, including Hepatitis B. Some countries, including the Pacific Island countries, Cameroon, and Bhutan, are receiving donor financing for new vaccines. There is also anecdotal evidence that some poorer countries that are receiving donor financing for traditional EPI antigens are buying additional vaccines, such as Hepatitis B and yellow fever, with government funds.
- ▲ Cost recovery for preventive health services in general was reported in only 21 countries in the survey (27 percent) and only 14 countries (18 percent) reported cost recovery specifically for immunization services. Two-thirds of the countries reporting cost recovery for immunization services in the survey are in Sub-Saharan Africa, where the Bamako Initiative is being implemented, while no country in the LAC region reported its use. Fees per immunization card or per shot were the most common methods reported, especially in Africa. The amount of costs recovered were in most cases unknown, but where estimated were generally low (less than 5 percent of total costs).

Effects of a Changing Health Sector on Immunization Financing:

Decentralization:

- ▲ Decentralization varies widely from country to country, and the effects on immunization programs differ. Since health reforms are still being implemented, it is difficult to fully assess their effects on the financing of immunization programs.
- ▲ According to the literature, some negative consequences of the move toward decentralization of health service delivery on immunization programs are occurring as countries put new management systems into place. In order to reduce any negative effects that might occur, some change needs to take place to enable the functioning of immunization programs under decentralization to occur more smoothly. Since decentralization is accompanied by reforms that rearrange financial mechanisms, donors must also rearrange their funding mechanisms and behaviors in these countries, for instance, by targeting funding to different levels of the health system, as appropriate, and by involving local governments in determining how best to spend donated funds.

Private Sector/NGO Participation in Immunization Service Provision and Financing:

- ▲ The involvement of NGOs in the provision of immunizations, although small, is important in many countries, particularly in Sub-Saharan Africa. However, the extent to which these NGOs provide additional resources to national immunization programs or are simply an extension of the

governments' program is not known. The specific composition of their clientele (e.g., urban vs. rural, better off vs. poor) is also not well documented.

- ▲ The involvement of the private for-profit sector in the provision of immunizations appears to be growing, particularly in urban areas. However, insufficient information is available on the extent of this involvement, the extent to which previously underserved populations are being served by the private sector, and whether this mechanism of distribution is increasing resources available for immunization programs.

Disease Eradication Programs:

- ▲ The few studies that have examined the impact of the polio eradication campaign on national immunization programs suggest that there have been both positive and negative effects. For example, people's knowledge of the benefits of immunizations has sometimes increased due to the extensive social mobilization efforts associated with the campaign. On the other hand, the level of resources available for routine immunization programs may have decreased. More research on this issue is required in order to determine the extent of the impact on routine immunization programs and how future disease control programs can benefit and work hand-in-hand with national immunization programs.

International Mechanisms to Facilitate Vaccine Financing

- ▲ Three international mechanisms have been developed to assist countries in increasing their financial contribution for vaccines. The oldest, begun in 1979, is PAHO's Revolving Fund, which operates on the concept of a pooled common revolving fund and which is able to secure low vaccine prices through large volume contracts with manufacturers. The Vaccine Independence Initiative (VII), which was established by UNICEF in 1991, sets up an individual revolving fund for each country, which then has access to low-cost, high-quality vaccines through UNICEF's procurement system. Both the PAHO Revolving Fund and the VII allow countries to buy vaccines in local currency and to pay for them only after the vaccine deliveries have been made, thereby eliminating two major obstacles—the lack of hard currency and the need to pay for vaccines in advance—that developing countries often face in purchasing vaccines on the open market. To date, all but four countries in the LAC region participate in the PAHO Revolving Fund, and 20 countries (including 12 Pacific Island countries, but not including countries participating in the VII through the EU Initiative) currently have VII contracts. The recently developed European Union Initiative, currently being implemented in seven Sahelian African countries, earmarks EU structural adjustment funding for immunization by creating an immunization or vaccine line item in each government budget and provides access to UNICEF's VII.
- ▲ According to its proponents, the EU Initiative has resulted in vaccine financing being much more secure and having a greater priority among governments in some of the world's poorest countries than has been the case in the past. The initiative has, however, been criticized for targeting the countries least able to pay for vaccines, thereby increasing the likelihood of funds being taken away from other critical immunization or health program components. Other problems attributed to the program are the lack of a mechanism to track governments' share of vaccine financing, and the lack of concrete plans to gradually increase the governments' share of financing over time.

3.2 Gaps in Information

This review has found that there is a considerable lack of information on many aspects of immunization costs and financing. The most salient gaps in information include the following:

Costs:

- ▲ Updated information on the costs of routine immunization programs to follow up on the cost studies conducted in the 1980s;
- ▲ Cost savings associated with greater program efficiencies;
- ▲ The additional costs of incorporating new vaccines (especially Hepatitis B, Hib, and yellow fever) into national immunization programs and the components of the additional costs of introducing these vaccines;

Vaccine and Immunization Financing:

- ▲ The proportion of total immunization program costs for which governments are actually paying;
- ▲ The impact of decreased donor funding for vaccines and immunization programs and corresponding increase of national governments' share of immunization costs on immunization coverage rates and on the overall performance and quality of immunization programs;
- ▲ The impact of adding new vaccines on the financing mechanisms and available funding for immunization programs overall (including the effect on funding for other immunization program components and/or health programs);
- ▲ The actual prevalence in developing countries of both formal and informal cost recovery for immunization services (including cross-subsidization from fees for other health services) and the actual and potential rates of cost recovery that they are achieving or could achieve;
- ▲ Information on who is and is not using immunization services in areas where cost recovery is being implemented, and the impact of cost recovery on the quality and effectiveness of these services;
- ▲ Information on whether or not cost recovery can be a valuable means of enhancing the sustainability of immunization programs and under what circumstances, and which specific cost recovery mechanisms have the most potential for mobilizing additional resources without having a negative impact on utilization;
- ▲ The prevalence and potential for financing mechanisms other than user fees to pay for the costs of immunization programs;

Effect of Changing Health Sector on Immunization Financing:

- ▲ The extent to which flows of funds in decentralized health systems are covering immunization program costs previously funded directly by the central ministry of health;

- ▲ The extent to which, and how resources have been mobilized at the local level for immunization services in countries with decentralized health systems;
- ▲ The extent to which the private sector has become involved in immunization service delivery, especially in countries with decentralized health systems, and the extent to which, if at all, participation of the NGO and for-profit sectors lowers the immunization program costs to the government;
- ▲ The impact of increased private sector participation in immunization service delivery on the equity of access to services, on coverage, and on the quality and safety of services;
- ▲ The extent to which polio eradication has affected the availability of resources for routine immunization services, and how disease control campaigns can be designed and implemented to benefit routine immunization programs and to minimize any negative effects on the management and financing of routine immunization activities;

International Mechanisms to Facilitate Vaccine Financing:

- ▲ The impact of increased government share of vaccine financing through the VII, the PAHO Revolving Fund, or the EU Initiative on countries' vaccine supplies;
- ▲ The key country or other factors that improve or hinder the success of these vaccine financing mechanisms;
- ▲ The impact of these mechanisms on the long-term sustainability of country financing of vaccines and immunization programs, especially given that the VII and EU Initiative were conceived as short-term measures;
- ▲ How each of these mechanisms can be improved to minimize vaccine shortages, ensure the long-term sustainability of vaccine and immunization program financing, and ensure that increased government funding of vaccines does not result in inadequate funding of critical immunization program components;
- ▲ Other barriers to the long-term sustainability of country financing of immunization programs that these mechanisms are not addressing;
- ▲ Information on countries' experiences with direct procurement of vaccines and under what circumstances direct procurement is more beneficial to countries than participation in one of these mechanisms;
- ▲ Information on countries' experiences with using World Bank or other loans to finance vaccines and national immunization programs, and the impact of these loans on the long-term sustainability of immunization programs;
- ▲ Information on whether or not vaccine wastage and other inefficiencies have been reduced as a result of increased government share of vaccine financing;

- ▲ Whether there are other potential mechanisms, such as endowments and trusts, that could be attempted to improve the long-term sustainability of country financing of vaccines and immunization programs.

Annex A: Supplementary Tables from Email Surveys

Annex Table A1:
List of Countries by Percentage of Government Contribution to Vaccine Funding, Respondents to UNICEF E-mail Survey

Region	0%	1-25%	26-50%	51-75%	76-99%	100%	Insufficient Information
Asia/Pacific	Bhutan Lao People's Democratic Republic North Korea	Cambodia (20.0) Mongolia (19.5)	None	Pacific Islands (56.8)*	India (99.96)	Indonesia Philippines	Sri Lanka
Eastern Europe/ NIS	Albania Bosnia Tajikistan	Armenia (12.3) Turkmenistan (16.0)	Kyrgyzstan (37.9) Uzbekistan (41.2)	Georgia (63.3) Kazakhstan (67.0)	None	Croatia Yugoslavia	None
Latin America/ Caribbean**	None	None	St. Kitts and Nevis (39.1)	Bolivia (63.8)	Cuba (96.7) Nicaragua (98.0) Peru (99.5) St. Vincent and Grenadine (86.9) Argentina (98.0)	Antigua and Barbuda Barbados Brazil British Virgin Islands Colombia Costa Rica Dominica El Salvador Grenada Guatemala Honduras Mexico Montserrat Panama St. Lucia Suriname Trinidad and Tobago Turks and Caicos	None
Middle East/ North Africa	None	None	Yemen (30.0)	None	Iraq (98.1) Lebanon (87.2)	Algeria Oman Tunisia	None
Sub-Saharan Africa	Burkina Faso Burundi Cape Verde Comoros Djibouti Equatorial Guinea Ethiopia Kenya Liberia Mozambique Niger Rwanda Somalia Zambia	Guinea (20.0) Lesotho (25.0) Madagascar (6.7) Sudan (4.0)	Benin (41.0) Cameroon (27.7) Senegal (44.1) Togo (40.0)	None	Nigeria (83.5)	Botswana Ivory Coast South Africa	None

* Includes funding for Hepatitis B (The Pacific Island countries self-finance their traditional EPI antigens, but depend entirely for donors for Hepatitis B vaccine.)

**Includes vaccine supplies

Annex Table A2 Number of Countries Responding with New Vaccines in their National Immunization Programs, by Region				
Region	No. Countries Responding	Hepatitis B	Hib	Yellow Fever
Asia/Pacific	10	Bhutan, Indonesia, Mongolia, Pacific Islands, Philippines	None	None
Eastern Europe/NIS	11	Georgia, Kyrgyzstan, Turkmenistan, Uzbekistan, Yugoslavia	None	None
Latin America/Caribbean	25	Antigua and Barbuda, Argentina*, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominica, Honduras, Mexico, Peru, St. Kitts and Nevis, St. Lucia, Suriname, Trinidad and Tobago, Turks and Caicos	Argentina, Colombia, Costa Rica, Peru	Brazil, Colombia, Peru, Suriname
Middle East /North Africa	6	Iraq, Lebanon, Oman, Tunisia	None	None
Sub-Saharan Africa	26	Botswana, Comoros, Nigeria, South Africa	None	Burkina Faso, Ivory Coast, Niger, Nigeria, Senegal
*High-risk groups covered only				

Annex Table A3
List of Countries by Percentage of Government Contribution for Recurrent Immunization Program Costs (excluding personnel costs),
Respondents to UNICEF Survey

Region	0%	1-25%	26-50%	51-75%	76-99%	100%	Insufficient Information
Asia/Pacific	Lao PDR	Bhutan (7.0) Cambodia (15.0)	None	None	India (85.0) Mongolia (83.3)	None	Indonesia North Korea Pacific Sri Lanka Philippines
Eastern Europe/NIS	None	Armenia (5.5)	None	None	Georgia (79.0)	None	Albania Bosnia Croatia Kazakstan Kyrgystan Tajikistan Turkmenistan Yugoslavia Uzbekistan
Latin America/ Caribbean	None	None	None	Montserrat (64.0)	Argentina (98.0) British Virgin Islands (94.5) Cuba (98.3) Dominica (93.7) Grenada (86.2) St. Lucia (96.6) St. Vincent and Grenadine (87.0) Trinidad and Tobago (92.8) Turks and Caicos (79.0)	Antigua and Barbuda Barbados	Costa Rica Guatemala Mexico
Middle East/ North Africa	None	None	None	None	Tunisia (97.8)	None	Algeria Iraq Lebanon Oman Yemen
Sub-Saharan Africa	Burundi Equatorial Guinea Ethiopia Liberia Mozambique Rwanda Zambia	Benin (14.3) Comoros (9.5) Madagascar (6.0)	Burkina Faso (46.0) Senegal(42.0) Sudan (32.2)	None	None	Ivory Coast South Africa	Botswana Cameroon Cape Verde Djibouti Guinea Kenya Lesotho Niger Nigeria Somalia Togo

Annex Table A4: Government Contribution (%) to Financing of Vaccines and Total Recurrent Immunization Program Costs, by Country*					
Region/ Country	Government Share of Vaccine Financing (%)*	Government Share of Financing for Total Recurrent Program Costs (%)**	Region/ Country	Government Share of Vaccine Financing (%)*	Government Share of Financing for Total Recurrent Program Costs (%)**
Asia/Pacific			Latin America/ Caribbean		
Bhutan	0.0	7.0	Antigua and Barbuda	100.0	100.0
Cambodia	20.0	15.0	Argentina	98.0	98.0
India	99.9	85.0	Barbados	100.0	100.0
Indonesia	100.0	N/A	Bolivia**	63.8	60.6
Laos	0.0	0.0	Brazil**	100.0	99.9
Mongolia	19.5	83.3	British Virgin Islands	100.0	94.5
North Korea	0.0	N/A	Colombia**	100.0	99.7
Pacific Islands	56.8***	N/A	Costa Rica	100.0	N/A
Philippines	100.0	N/A	Cuba	96.7	98.3
Sri Lanka	N/A	N/A	Dominica	100.0	93.7
Eastern Europe/ NIS			El Salvador**	100.0	96.9
Albania	0.0	N/A	Grenada	100.0	86.2
Armenia	12.3	5.5	Guatemala**	100.0	N/A
Bosnia	0.0	N/A	Honduras**	100.0	81.0
Croatia	100.0	N/A	Mexico	100.0	N/A
Georgia	63.3	79.1	Montserrat	100.0	64.0
Kazakhstan	67.0	N/A	Nicaragua	98.0	74.0
Kyrgyzstan	37.9	N/A	Panama	100.0	56.7
Tajikistan	0.0	N/A	Peru	99.5	95.3
Turkmenistan	16.0	N/A	St. Lucia	100.0	96.6
Uzbekistan	41.2	N/A	St. Vincent and Grenadine	86.9	87.0
Yugoslavia	100.0	N/A	St. Kitts and Nevis	39.1	46.6
			Suriname**	100.0	76.1
			Trinidad and Tobago	100.0	92.8
			Turks and Caicos	100.0	79.0

Annex Table A4: Government Contribution (%) to Financing of Vaccines and Total Recurrent Immunization Program Costs, by Country*					
Region/ Country	Government Share of Vaccine Financing (%)*	Government Share of Financing for Total Recurrent Program Costs (%)**	Region/ Country	Government Share of Vaccine Financing (%)*	Government Share of Financing for Total Recurrent Program Costs (%)**
Middle East and North Africa			Ethiopia	0.0	0.0
Algeria	100.0	N/A	Guinea	20.0	N/A
Iraq	98.0	N/A	Ivory Coast	100.0	100.0
Lebanon	87.0	N/A	Kenya	0.0	N/A
Oman	100.0	N/A	Lesotho	25.0	N/A
Tunisia	100.0	97.8	Liberia	0.0	0.0
Yemen	30.0	N/A	Madagascar	6.7	6.0
Sub-Saharan Africa			Mozambique	0.0	0.0
Benin	41.0	14.3	Niger	0.0	N/A
Botswana	100.0	N/A	Nigeria	83.5	N/A
Burkina Faso	0.0	46.0	Rwanda	0.0	0.0
Burundi	0.0	0.0	Somalia	0.0	N/A
Cameroon	27.7	N/A	South Africa	100.0	98.0
Cape Verde	0.0	N/A	Sudan	4.0	32.2
Comoros	0.0	9.5	Togo	40.0	N/A
Djibouti	0.0	N/A	Zambia	0.0	0.0
Equatorial Guinea	0.0	0.0			
<p>* Latin American percentages under vaccine financing include vaccine supplies (syringes, some cold chain equipment).</p> <p>**Total immunization program costs involve all recurrent costs, including vaccines, but not including salaries. For the PAHO countries responding to the survey (indicated by**), the total immunization program costs include capital expenditures.</p> <p>***Includes financing for Hepatitis B, which is funded by donors.</p>					

**Annex Table A5 : Estimate of Percentage of Immunization Services
Delivered by the Private Sector and NGOs, E-Mail Surveys***

Region	0%		Less Than 5%		5-10%		11-25%		26-40%		Greater than 40%		No Answer		TOTAL	
	Countries Responding	%	Countries Responding	%	Countries Responding	%	Countries Responding	%	Countries Responding	%	Countries Responding	%	Countries Responding	%	No.	%
Asia/Pacific	Bhutan Cambodia Lao PDR Mongolia North Korea	50.0	Philippines (2%)	10.0		0.0	India (10-15%) Indonesia (20%) Sri Lanka (10-15%)	30.0	0	0.0	0	0.0	Pacific Islands	10.0	10	100.0
Eastern Europe/NIS	Albania Armenia Bosnia/Herz. Croatia Kazakhstan Kyrgyzstan Tadjikistan Turkmeni- stan Yugoslavia	81.8	Georgia (1-2%)	9.1	0.0	0.0	0.0	0.0	0	0.0	0	0.0	Uzbekistan	9.1	11	100.0
Latin America/Caribbean*	Cuba St. Kitts and Nevis	13.3	Argentina (2%) Brazil (1-2%) El Salvador (2%) Nicaragua (3.5%) Peru (2-3%)	33.3	Bolivia (8%) Colombia (10%) Guatemala (10%) Honduras (5%) Mexico (10%)	33.3	Costa Rica (10-14%) Suriname (20%)	13.3	0	0.0	0	0.0	Panama	6.7	15	100.0
Middle East/North Africa	Algeria Iraq Yemen	50.0	Oman (<1%)	16.7	Tunisia (6%)	16.7	0	0.0	0	0.0	Lebanon (80%)	16.7	0	0.0	6	100.0
Sub-Saharan Africa	Benin Cape Verde Liberia	11.5	Botswana (<1%) Djibouti (2%) Ethiopia Kenya (<5%) Madagascar (2%) Niger	23.1	B. Faso (<10%) Eq. Guinea (10%) Mozambique (<10%) Senegal (10%) South Africa (5%) Sudan (5%)	23.1	Nigeria (<25%) Togo (15%)	7.7	Burundi (35%) Cameroon (40%) Rwanda (40%)	11.5	Lesotho (50%) Somalia (80%)	7.7	Comoros Ivory Coast Guinea Zambia	15.4	26	100.0
TOTAL	22	32.4	14	20.6	12	17.6	7	10.3	3	4.4	3	4.4	7	10.3	68	100.0

*Does not include the 10 Caribbean island countries that responded to the UNICEF E-mail survey.

**Annex Table A6: Countries Reporting Delivery of Immunization
through Private Sector Channels, by Region**

	NGOs		For Profit Health Facilities		Drug Stores		Other	
Region	Countries	% of Countries	Countries	% of Countries	Countries	% of Countries	Countries	% of Countries
Asia/Pacific	India Indonesia	22.2	India Indonesia Sri Lanka	33.3	India Indonesia	22.2	Philippines	11.1
Eastern Europe/NIS	0	0.0	0	0.0	Georgia Uzbekistan	18.2	Kazakhstan	9.1
Latin America/ Caribbean*	Bolivia Colombia El Salvador Guatemala Panama Peru Suriname	28.0	Argentina Bolivia Brazil Colombia Guatemala Honduras Jamaica Nicaragua Panama Peru Suriname	66.7	Argentina Bolivia Brazil Guatemala Honduras Mexico	40.0	Costa Rica El Salvador	13.3
Middle East/ North Africa	Lebanon	16.7	Lebanon Oman	33.3	Lebanon Tunisia	33.3	0	0.0
Sub-Saharan Africa	Burkina Faso Burundi Cameroon Comoros Equatorial Guinea Ethiopia Ivory Coast Kenya Lesotho Madagascar Mozambique Nigeria Rwanda Senegal Somalia Sudan Togo Zambia	69.2	Burkina Faso Burundi Cameroon Ethiopia Ivory Coast Kenya Nigeria Senegal Somalia South Africa Sudan Zambia	46.2	Burkina Faso Cameroon Djibouti Kenya Niger S. Africa	23.1	Botswana	3.8
TOTAL	28	41.2	27	39.7	18	26.5	5	7.4

* Does not include the 10 Caribbean island countries responding to the UNICEF E-mail survey.

Annex B: UNICEF and PAHO E-Mail Survey Forms

UNICEF E-Mail Survey

SURVEY ON FINANCING OF EPI

The Partnerships for Health Reform (PHR) Project, a world-wide project funded by USAID, has been asked to carry out research on the financing and costs of immunization. The goal of this initiative is to assist countries in developing appropriate financing strategies for their immunization programs, especially as donor funding for EPI declines and as new, relatively expensive vaccines become available. PHR will be conducting case studies on EPI financing in a number of countries and will develop guidelines and a menu of options that EPI managers can use in planning the financing of their immunization programs. This work is being coordinated with the CVI.

As an initial step in this initiative, we are conducting a review of existing information on the financing of national immunization programs, including information on cost recovery mechanisms being used and how dependent countries still are on donors for different aspects of their programs. To help us obtain this information, we would greatly appreciate your taking the time to complete this survey as much as you can. If you do not have all of the requested information available, please answer what you can. Please send the survey form by Monday, March 9 to:

denise_deroeck@abtassoc.com

We want to thank all UNICEF officers in advance for their assistance. We will be happy to share the results of this survey with you. We will also be collaborating with UNICEF on the country case studies that we plan on conducting this year.

Name and Title of UNICEF Officer: _____

Country: _____

Date: _____

1) What antigens are included in the country's EPI? (Put an x):

_____ DPT _____ Measles _____ Polio (OPV or IPV)

_____ BCG _____ Hepatitis B _____ Hib

_____ Rubella _____ MMR _____ Other (Specify:)

A. Funding Sources for EPI

1) Is there a line item specifically for immunization (EPI) in the government's national budget?

_____ Yes _____ No

2) What is the contribution from the national government and donors for the following (if exact figures are not available, please give an estimated percentage):

a) Total cost of vaccines:

government*: US\$_____ % of total vaccine costs:_____ %

donors: US\$_____ % of total vaccine costs:_____ %

_____ Don't have enough information to answer accurately.

b) Total recurrent EPI budget (excluding salaries):

government*: US\$_____ % of total EPI costs:_____ %

donors: US\$_____ % of total EPI costs:_____ %

_____ Don't have enough information to answer accurately.

* Includes funds recovered through user fees where applicable, as well as loans from the World Bank and other development banks.

3) Is detailed information available on the proportion of government funding for the specific components of EPI -- such as vaccines, cold chain, vaccine delivery/logistics, training, etc.?

_____ Yes _____ No

4) Can you obtain this information?

_____ Yes _____ No

If so, please provide this information to us by e-mail or fax, if it is readily available. (Our fax # is: (301) 652-3916.)

B. Cost Recovery for EPI

1) Are there cost recovery mechanisms in place for health services in general for:

Curative care? _____ Yes _____ No Preventive care? _____ Yes _____ No
Hospital care? _____ Yes _____ No

2) Is cost recovery in place at:

☐ public facilities
☐ private facilities?
☐ both?
☐ Don't know

3) Is there a formal policy for cost recovery for immunization services?

☐ Yes ☐ No ☐ Don't know

4) Is cost recovery for immunization actually being implemented?

☐ Yes ☐ No ☐ Don't know

5) What cost recovery mechanisms are used for immunization? (put an x on all that apply):

☐ Fee per shot or series Fee amount (and currency): _____

☐ Fee for immunization card Fee amount (and currency): _____

☐ Cross-subsidization (user fees for primary health care used for EPI)

☐ Social insurance (national-level)

☐ Prepayment schemes (local-level)

☐ Other (please describe): _____

☐ None

☐ Don't know

6) Are these cost recovery mechanisms for EPI (put an x):

☐ Nationwide?

☐ In some regions, provinces or states only?

☐ In some localities (municipalities, districts, etc.) only?

☐ Don't know

7) Can you give any estimate of what percentage of total costs for EPI are recovered through these mechanisms?

☐ % ☐ Don't know

8) Are there earmarked taxes for EPI? ☐ Yes ☐ No

C. Private Sector

1) Are vaccines delivered through the private sector in the country? If so, through what type of providers (put an x for all that apply):

_____ NGOs and church missions _____ For-profit private providers
_____ Private pharmacists/drug stores _____ Other (Specify):

2) What percentage of all vaccinations would you estimate are delivered by the private sector? _____%

Please add below any additional comments or information:

WE GREATLY APPRECIATE YOUR TIME AND EFFORT IN COMPLETING THIS SURVEY!!! WE WILL SEND YOU THE RESULTS IN THE NEAR FUTURE.

PAHO/PHR SURVEY ON FINANCING OF EPI

The Partnerships for Health Reform (PHR) Project, a worldwide project funded by USAID, has been asked to carry out research on the costs and financing of immunization. The goal of this activity is to assist countries in developing appropriate financing strategies for their immunization programs, especially as donor funding for EPI declines and as new, relatively expensive vaccines become available. PHR will be collaborating with PAHO on these activities in the region of the Americas.

As an initial step, we are conducting a review of existing information on the financing and costs of national immunization programs, including information how countries are currently financing their EPIs and how dependent they still are on donors for different aspects of their programs. We would therefore greatly appreciate your taking the time to complete this survey as best as you can and *send your reply no later than February 15, 1998 to:*

PAHO (address):
Dr. Cristina Nogueira

NOGUEIRC@PAHO.ORG

Fax: (202) 974-3635

PHR (address):
Denise DeRoeck

Denise_deroeck@abtassoc.com

We will be happy to send you the results of the survey once it is completed.

Name and Title of person completing form: _____

Country: _____

Date: _____

1) What antigens are included in the country's EPI? (Put an x):

- ☐ DPT
 ☐ Measles
 ☐ Polio (OPV or IPV)
- ☐ BCG
 ☐ Hepatitis B
- ☐ Hib
- ☐ Rubella
 ☐ MMR
 ☐ Other (Specify:) _____

A. Funding for EPI

1) Is there a line item *specifically* for immunization (EPI) in the government's national budget?

☐ Yes ☐ No

- 2) If so, please complete the following table showing a breakdown of the budget by national and external (donor) sources, as much as you can:

	1996		1997		1998	
EPI Budget	Amount	%	Amount	%	Amount	%
National government						
External (donor)						
Total		100%		100%		100%

- 3) Is detailed information available on the proportion of national and external funding for the *specific components* of EPI?

___ Yes ___ No

- 4) If so, please complete the following chart showing the budget by component for the most recent year for which you have information (if you do not have information for all of the components, leave those boxes blank):

Year: _____

Budget Component	National (government)		External (donors)	
	Amount	%	Amount	%
Vaccines and vaccine supplies (syringes, needles, etc.)				
Cold chain equipment & maintenance				
Vaccine delivery/logistics				
Training				
Supervision				
Social mobilization				
Outreach & mobile activities				
Disease surveillance				
Total				

B. Cost Recovery for Primary Health Care and EPI

Primary Health Care:

- 1) Is there a national formal policy for cost recovery for primary health care in your country?

___ Yes ___ No

- 2) If yes, for which services is there cost recovery? (Put an x for all that apply:)

___ Curative care?
___ Preventive care?

___ Hospital care?
___ Don't know

3) What happens to funds generated by health facilities through cost recovery mechanisms for primary health care?

- ☐ 100 percent of funds are retained by health facility for operational costs
- ☐ Facilities keep a portion of funds and turn over the rest to the (check one):
- ☐ local health authorities (municipality, district)
 - ☐ regional (state, provincial) health authorities
 - ☐ national health authorities
- ☐ All recovered costs are turned over to:
- ☐ local health authorities (municipality, district)
 - ☐ regional (state, provincial) health authorities
 - ☐ national health authorities
- ☐ Don't know/no information

EPI:

4) Is there a formal policy for cost recovery for *immunization* services?

- ☐ Yes ☐ No
- ☐ Don't know

5) If so, is cost recovery for EPI implemented:

- ☐ nationwide?
- ☐ in some regions, provinces or states only?
- ☐ in some localities (municipalities, districts, etc.) only?
- ☐ Don't know

6) For each type of health care organization, what cost recovery mechanisms, if any, are used for immunization? (put an x on all that apply):

a) Government facilities:

- ☐ Fee per shot or series Fee amount (and currency): _____
- ☐ Fee for immunization card Fee amount (and currency): _____
- ☐ Cross-subsidization (user fees for primary health care used for EPI)
- ☐ Social insurance (national-level)
- ☐ Prepayment schemes (local-level)
- ☐ Other (please describe): _____
- ☐ None ☐ Don't know

b) Social Security facilities (where applicable):

- ☐ Fee per shot or series Fee amount (and currency): _____
- ☐ Fee for immunization card Fee amount (and currency): _____
- ☐ Cross-subsidization (user fees for primary health care used for EPI)
- ☐ Other (please describe): _____
- ☐ _____
- ☐ None ☐ Don't know

c) NGOs:

- ☐ Fee per shot or series Fee amount (and currency): _____

_____ Fee for immunization card/Fee amount (and currency): _____
 _____ Cross-subsidization (user fees for primary health care used for EPI)
 _____ Prepayment schemes (local-level)
 _____ Other (please describe): _____

 _____ None Don't know

7) Can you give an estimate of what percentage of total costs for EPI are recovered through these mechanisms?

____%

____ Don't know

C. Planning, Budgeting, and Control of Funds for EPI

1) At what level(s) of the health system does program planning for EPI take place? (Put an x for all that apply):

☐ National level
 ☐ Regional
 (state, province, etc.)
 ☐ Local
 (municipality, district, etc.)

☐ Don't know

2) At what level(s) of the health system is a budget for EPI developed?

☐ National level
 ☐ Regional
 (state, province, etc.)
 ☐ Local
 (municipality, district, etc.)

☐ Don't know

3) What proportion of the EPI budget would you estimate comes from each level of the health system?

National level: _____ %
Regional (state, province, etc.) _____ %
Local (municipality, district, etc.) _____ %
100 %

D. Private Sector

1) Are vaccines delivered through the private sector in the country? If so, through what type of providers (put an x for all that apply):

☐ NGOs and church missions ☐ For-profit private providers
☐ Private pharmacists/drug stores ☐ Other (Specify):
☐ Don't know/not sure

2) What percentage of all vaccinations would you estimate are delivered by the private sector?
%

3) Does the Ministry of Health give vaccines free to the private sector?

Yes No Don't know

4) If yes, do private providers:

☐ charge for vaccines and consultation (visit)?
☐ charge for consultation only?
☐ do not charge at all?
☐ Don't know

Please add below any additional comments or information:

WE GREATLY APPRECIATE YOUR TIME AND EFFORT IN COMPLETING THIS SURVEY!!! WE WILL SEND YOU THE RESULTS IN THE NEAR FUTURE.

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